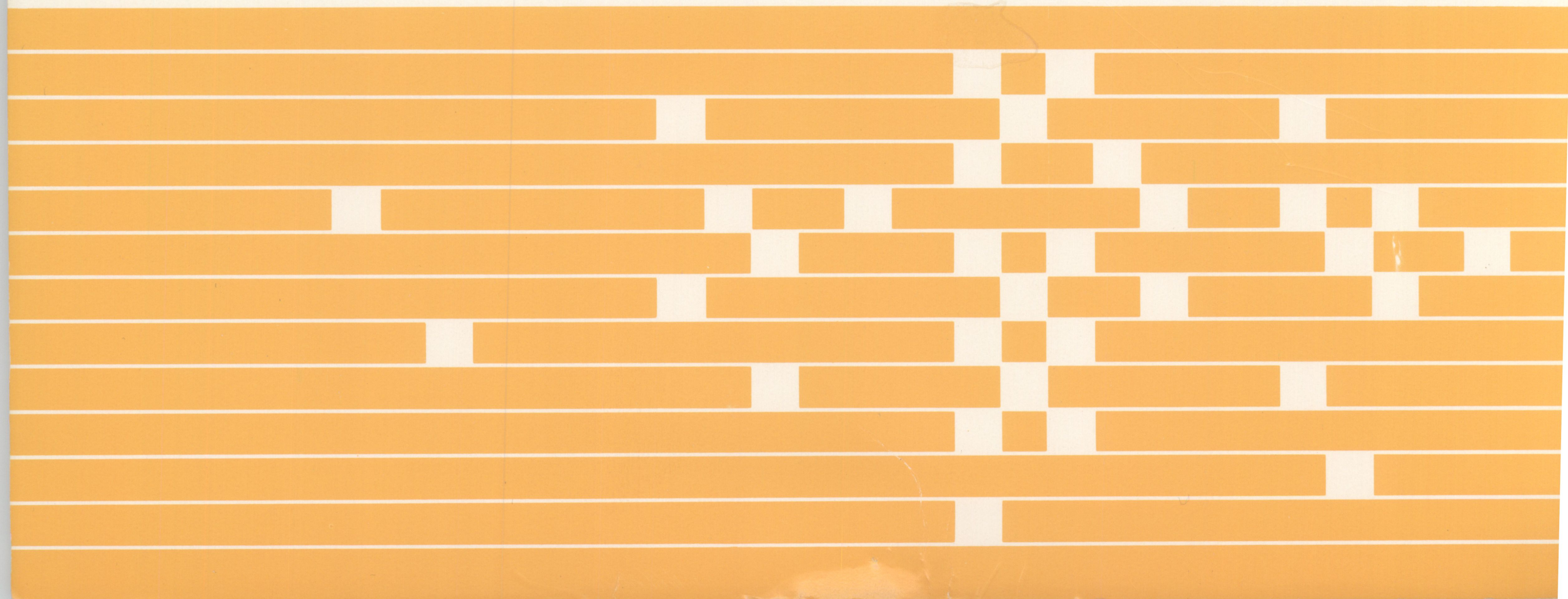
SY31-0652-5

IBM 5294 Control Unit

Maintenance Analysis Procedures

IBM



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Maintenance Analysis Procedures

Sixth Edition (November 1987)

This revision makes obsolete SY31-0652-4. Changes or additions were made to include information for the Text Entry Assist "A" feature.

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Preface

These maintenance analysis procedures (MAPs) are to be used for servicing the IBM 5294 Control Unit (work station controller). They are to be used by qualified maintenance personnel who are assumed to have completed the 5294 Control Unit education course.

This manual is designed for use with the *IBM 5294 Control Unit Maintenance Library*, SY31-0653. Definitions of terms and abbreviations that are not common, but are used in the MAPs, are in the *Glossary* of the *5294 Control Unit Maintenance Library*.

It is important that you start your call with Start of Call MAP 0100, which leads to a repair action.

There are several DANGER notices in this manual. You can use the blank lines below each notice to translate the notice into your own words. Specific DANGERs are listed in the *Safety* section.

Related Publications

- *IBM Synchronous Data Link Control General Information*, GA27-3093
- *IBM 5250 Information Display System Functions Reference Manual*, SA21-9247
- *IBM 5251 Display Station Models 2 and 12 Maintenance Information Manual*, SY31-0463
- *IBM Systems Network Architecture Handbook, Customer Service Division*, S229-4522
- *Introduction to Data Communications for Customer Engineers*, ZY31-0634
- *IBM 5294 Control Unit Setup Procedure*, GA21-9369
- *IBM 5294 Control Unit Operator's Guide*, GA21-9370
- *IBM Communications Systems Bulletin, X.25 Primer*, GG22-9103
- *IBM X.25 Inteface for Attaching IBM SNA Nodes to Packet-Switched Data Networks General Information Manual*, GA27-3345
- *IBM 5294 Control Unit Reference Card*, ZX21-9498
- *IBM Implementation of X.21 Interface General Information Manual*, GA27-3287
- *IBM Cabling System Planning and Installation Guide*, GA27-3361

Contents

Safety

DANGER NOTICES

Throughout this manual, the word DANGER is used to inform you of an action that could cause a personal injury. If desired, translate these notices and write your own words on the blank lines provided on these pages.

The 5294 Control Unit has the following specific DANGERs:

- 550 Vdc is present at the power supply.

  ____

  ____

- Line voltage is present at the inside rear of the machine (I/O panel) and at the inside front of the machine (control panel).

  ____

  ____

  ____

  ____

If the need for a safety inspection occurs for this machine, see the section *Safety Inspection* in the *IBM 5294 Control Unit Maintenance Library*.

CSR SAFETY PRACTICES

All Customer Service Representatives are expected to take every safety precaution possible and observe the following safety practices while maintaining IBM equipment:

1. You should not work alone under hazardous conditions or around equipment with dangerous voltage. Always advise your manager if you MUST work alone.
2. Remove all power, ac and dc, when removing or assembling major components, working in immediate areas of power supplies, performing mechanical inspection of power supplies, or installing changes in machine circuitry.
3. After turning off wall box power switch, lock it in the Off position or tag it with a "Do Not Operate" tag, Form 229-1266. Pull power supply cord whenever possible.
4. When it is absolutely necessary to work on equipment having exposed operating mechanical parts or exposed live electrical circuitry anywhere in the machine, observe the following precautions:
   a. Another person familiar with power off controls must be in immediate vicinity.
   b. Do not wear rings, wrist watches, chains, bracelets, or metal cuff links.
   c. Use only insulated pliers and screwdrivers.
   d. Keep one hand in pocket.
   e. When using test instruments, be certain that controls are set correctly and that insulated probes of proper capacity are used.
   f. Avoid contacting ground potential (metal floor strips, machine frames, etc.). Use suitable rubber mats, purchased locally if necessary.
5. Wear safety glasses when:
   a. Using a hammer to drive pins, riveting, staking, etc.
   b. Power or hand drilling, reaming, grinding, etc.
   c. Using spring hooks, attaching springs.
   d. Soldering, wire cutting, removing steel bands.
   e. Cleaning parts with solvents, sprays, cleaners, chemicals, etc.
   f. Performing any other work that may be hazardous to your eyes. REMEMBER–THEY ARE YOUR EYES.
6. Follow special safety instructions when performing specialized tasks, such as handling cathode ray tubes and extremely high voltages. These instructions are outlined in CSRMs and the safety portion of the maintenance manuals.
7. Do not use solvents, chemicals, greases, or oils that have not been approved by IBM.
8. Avoid using tools or test equipment that have not been approved by IBM.
9. Replace worn or broken tools and test equipment.
10. Lift by standing or pushing up with stronger leg muscles–this takes strain off back muscles. Do not lift any equipment or parts weighing over 60 pounds.
11. After maintenance, restore all safety devices, such as guards, shields, signs, and grounding wires.
12. Each Customer Service Representative is responsible to be certain that no action on his part renders products unsafe or exposes customer personnel to hazards.
13. Place removed machine covers in a safe out-of-the-way place where no one can trip over them.
14. Ensure that all machine covers are in place before returning machine to customer.
15. Always place CSR tool kit away from walk areas where no one can trip over it; for example, under desk or table.
16. Avoid touching moving mechanical parts when lubricating, checking for play, etc.
17. When using stroboscope, do not touch ANYTHING–it may be moving.
18. Avoid wearing loose clothing that may be caught in machinery. Shirt sleeves must be left buttoned or rolled above the elbow.
19. Ties must be tucked in shirt or have a tie clasp (preferably nonconductive) approximately 3 inches from end. Tie chains are not recommended.
20. Before starting equipment, make certain fellow CSRs and customer personnel are not in a hazardous position.
21. Maintain good housekeeping in area of machine while performing and after completing maintenance.

Knowing safety rules is not enough.
An unsafe act will inevitably lead to an accident.
Use good judgment–eliminate unsafe acts.

ARTIFICIAL RESPIRATION

General Considerations

1. Start Immediately–Seconds Count
   Do not move victim unless absolutely necessary to remove from danger. Do not wait or look for help or stop to loosen clothing, warm the victim, or apply stimulants.
2. Check Mouth for Obstructions
   Remove foreign objects. Pull tongue forward.
3. Loosen Clothing–Keep Victim Warm
   Take care of these items after victim is breathing by himself or when help is available.
4. Remain in Position
   After victim revives, be ready to resume respiration if necessary.
5. Call a Doctor
   Have someone summon medical aid.
6. Don't Give Up
   Continue without interruption until victim is breathing without help or is certainly dead.

Rescue Breathing for Adults

1. Place victim on his back immediately.
2. Clear throat of water, food, or foreign matter.
3. Tilt head back to open air passage.
4. Lift jaw up to keep tongue out of air passage.
5. Pinch nostrils to prevent air leakage when you blow.
6. Blow until you see chest rise.
7. Remove your lips and allow lungs to empty.
8. Listen for snoring and gurglings–signs of throat obstruction.
9. Repeat mouth to mouth breathing 10-20 times a minute. Continue rescue breathing until victim breathes for himself.



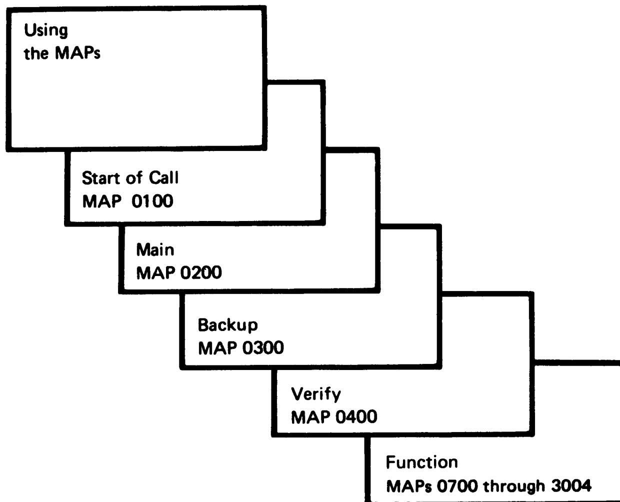
Thumb and finger positions



Final mouth-to-mouth position

How to Use the MAPs

MAP ORGANIZATION



Start of Call MAP 0100

The Start of Call MAP is the starting point for each service call. This MAP contains a symptom index, which is a list of single indications that are grouped by major units. These single indications lead either directly to a repair action in the maintenance information section of the maintenance library manual or to the Main MAP.

Main MAP 0200

The Main MAP generates symptoms from several indications. This MAP selects one indication at a time, with the most important and least difficult indication first, which results in the quickest path to a repair action.

Backup MAP 0300

The Backup MAP generates symptoms from indications, the same as the Main MAP, but uses fewer indications. As a result, the Backup MAP does not isolate the failure as close to the failing FRU as the Main MAP.

The Backup MAP relies on either the reports from the customer or the indications of intermittent failures (failures that were present but may not be present now).

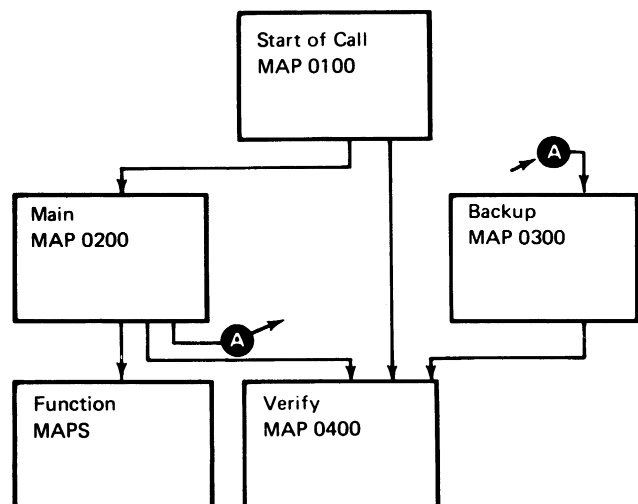
Verify MAP 0400

The Verify MAP is used after a repair action is made to ensure that the work station operates correctly.

Function MAPs 0700–3004

The Function MAPs are used with the circuit diagrams and procedures in the maintenance library manual.

MAP FLOW



USING THE MAPS

When using the MAPs, you must:

READ CAREFULLY. The MAPs can be used as an aid to find the failure only if you follow instructions and answer questions accurately.

FOLLOW THE SEQUENCE. Always do the procedure one step at a time. Some steps have additional information that pertains to that step. This information is directly across the page from the step and is an aid in describing why questions or an action is needed to determine the failing part.

Reference numbers refer to a location graphic, maintenance procedure, chart, or other pertinent information in the maintenance library manual.

FOLLOW THE INSTRUCTIONS. Instructions must be carried out exactly and in the order given. Questions rely on instructions immediately before the questions. Do not change the conditions prepared by the instructions before answering the questions.

START OF CALL MAP 0100

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
No entries in this table			

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	009	0200	C
2	010	0300	A

001

(Entry Point A)

*************** CAUTION **************

Ensure that any job on a terminal is signed off before using that terminal for concurrent mode diagnostics. Also ensure that all jobs are signed off before running dedicated mode diagnostics, powering off the machine, or disconnecting from the communication line.

****

INSTRUCTIONS

1. Before using this MAP, record all symptoms if the failure is still on the machine.

2. Ensure that at least one display station is attached, powered on, and is in a ready condition.

3. If this MAP or other MAPs do not correctly isolate the failure, go to Backup MAP 0300, Entry Point A.

One or more of the following indicates an error condition:
- A system reference code (SRC) displayed on an attached display station (MIM 2100).
- 5294 Power LED off.
- 5294 Ready LED off.
- 5294 Work Station Active LED off when one or more work stations are attached and powered on.

Is there an error condition?

Y N

2A 2B

System reference code (SRC) is a general term for a displayed code and includes operator error codes, diagnostic error codes, and operator or CE/CSR message codes.

Correct operation for normal power-on sequence when the Test switch is set to Normal:

- Power on.
- All LEDs go on for about 1 second for a lamp test.
- All LEDs except Power LED go off.
- The Ready LED goes on when diagnostics have been completed.
- The Work Station Active LED goes on if any attached work station is powered on and responds to polling from the controller.
- The controller is now ready to operate once the communication link to the host system is established.

B
1

002

Is there any failure present on the 5294 or the attached work stations?

Y N

003

Did the customer report an SRC?

Y N

004

If the failure is intermittent, do one of the following:

1. If all functions are operating correctly at present, check all error logs for logged errors (MIM 2050 and 2013).

Go to MAP 0300, Entry Point A.

2. If you do not know if the 5294 is operating correctly, start at MAP 0200, Entry Point A.

005

- Power off.
- Wait 5 seconds, then power on.
- Wait 10 seconds for diagnostics to be completed.

Is an error condition still present?

Y N

006

Did the customer report a D1XXXX, D2XXXX, D73XXX, or D77XXX SRC?

Y N

007

Did the customer report a D912XX or D914XX SRC?

Y N

008

Go to Page 3, Step 016, Entry Point C.

009

Go To Map 0200, Entry Point C.

010

Go To Map 0300, Entry Point A.

011

Go to Step 013, Entry Point B.

C

A C
1

012

Record all the symptoms you have and then:

Go to Page 8, Step 019, Entry Point D.

013

(Entry Point B)

Is an SRC displayed?

Y N

014

Go to MAP 0200, Entry Point A.

015

Go to Page 3, Step 016, Entry Point C.

016

(Entry Point C)

SYSTEM REFERENCE CODES

See MIM 2100 for a description of all system reference codes (SRCs)

OPERATOR ERROR/MESSAGE CODES

CODE	ADDITIONAL INFORMATION	ACTION
0055	Communications error. This error can occur if the DCE is powered off and/or on after the controller is powered on.	If this error occurs under other conditions, Go to MAP 0200, Entry Point C
004X or 005X (not 0055)	Communications error. If a 0040 or 0042 code is displayed, check that the Modem/DCE or Channel Service Unit is connected to the controller, powered on, and in normal operating mode	Go to MAP 0200, Entry Point C
0060 through 0078	For displayed SRCs only: Probable operator error	Go to MAP 0200, Entry Point E
0086	Occurs when trying to use MSR, light pen, self-check, copy-to-print feature, or Extended Function A feature (IPDS printers).	Go to MAP 0200, Entry Point E
008X (not 0086)	A configuration setup error occurred when trying to enter the configuration.	Check the error code and correct the error

(Step 016 continues)

(Step 016 continued)

OPERATOR ERROR/MESSAGE CODES (continued)

CODE	ADDITIONAL INFORMATION	ACTION
0099	Occurs when trying to communicate with the host system. Ensure that the Test switch is set to Normal.	Go to MAP 0200, Entry Point C
XXXX	Includes any other four character SRC that occurs during correct operation that is not listed above	Check definition of the code (MIM 2100). Go to MAP 0200, Entry Point D
10XXXX	X.25 operator error or X.25 configuration error. See MIM 2150 and 0460.	If operation correct: Feature ROS card (MIM 0740) X.25 ROS module (MIM 0741)
1XXXXX (not 10XXXX)	X.25 error	Check definition of the code (MIM 2160). Go to MAP 3002, Entry Point A
20XXXX	X.21 operator error or X.21 configuration error. See MIM 2165 and 0460.	If operation correct: Feature ROS card (MIM 0740) X.21 ROS module (MIM 0741)
2XXXXX (not 20XXXX)	X.21 error	Check definition of the code (MIM 2166), Go to MAP 3004, Entry Point A

(Step 016 continues)

(Step 016 continued)

DIAGNOSTIC ERROR CODES

CODE	ADDITIONAL INFORMATION	ACTION
D10001 D10002 (see note)	All LEDs off	Go to MAP 0200, Entry Point A
D11001 (see note)	Power LED on and all other LEDs off	Go to MAP 0200, Entry Point A
D13002 (see note)	Power LED on, Ready LED on, Work Station Active LED off	Go to MAP 0200, Entry Point A
D13003 (see note)	Power LED on, Ready LED off Work Station Active LED on	Go to MAP 0200, Entry Point A
D2XXXX	Feature ROS failure	Go to MAP 0700, Entry Point A
D3800X	RAM failure	Replace planar
D410XX D510XX D610XX D710XX	Work station adapter test	Replace planar
D73YXX Y = 1 thru F	Twinaxial driver/receiver test Use MIM 0520 to identify the failing port(s) from the value of Y in the SRC	Attached work ststion or connecting cable Driver/receiver card Planar Internal I/O cable To isolate to one FRU: Go to MAP 0200, Entry Point A

NOTE: These error codes are for reporting only and will not be displayed

(Step 016 continues)

(Step 016 continued)

DIAGNOSTIC ERROR CODES (continued)

CODE	ADDITIONAL INFORMATION	ACTION
D77YXX Y = 0 thru F	At least one error free response was received from the port(s) indicated by the port identifier "Y" in the SRC	Attached work station or connecting cable Driver/receiver card Planar To isolate to one FRU: Go to MAP 0200, Entry Point A
D8102X	Ensure that an X.21 planar is installed if the X.21 Sw. feature ROS is installed and that the X.21 jumper is on the planar (MIM 0410).	Replace planar If the failure occurs again, replace the X.21 Switched feature ROS module on the C5 card
D810XX (not D8102X)	Comm adapter level 1 test	Replace planar
D90009	Communication card type in the configuration record is not correct (MIM 0460)	Enter the correct communication card type in the configuration.
D910XX	Comm adapter level 2 test	Replace planar
D912XX or D914XX	Comm adapter level 2 test	Communication card Planar To isolate to one FRU: Go to MAP 1000, Entry Point A
DA1060	CMOS CRC error. Do setup (MIM 0460) then power off and power on in normal mode.	If the same problem occurs again, replace the planar
Any other DXXXXX error code	NOTE: Wait 5 seconds between power off and power on to avoid false error symptoms.	Go to MAP 0200, Entry Point B

(Step 016 continues)

(Step 016 continued)

ERRORS DETECTED DURING NORMAL OPERATION		
Do not use these errors for normal problem determination unless no other diagnostics errors (DXXXXX) are available.		
EOXXXX	Parity or bus time out errors during operation	Planar, Feature ROS card at C5 socket, Feature ROS card at C7 socket
EXXXXX (not EOXXXX)	Parity or bus time out errors during operation	Replace planar
FXXXXX	Error detected during operation	Ensure that EC down load is at the latest level Planar, Feature ROS card at C5 socket, Feature ROS card at C7 socket If the same failure occurs again, call for assistance

Did you find the SRC in the SRC index?

Y N

017

Go to MAP 0200, Entry Point A.

018

- Perform the indicated repair action.

Go to Verify MAP 0400, Entry Point A.

019

(Entry Point D)

- From the list below, pick the symptom that best matches the reported and/or observed symptom.

FAILURE SYMPTOMS		
COMMUNICATIONS		
MAJOR SYMPTOM	MINOR SYMPTOM	ACTION
Communication with the host system lost or cannot be established	1. Always in CSU mode	Test switch circuit failure Use MIM 0320 to isolate failure
	2. 004X, 005X or 0099 may be displayed	Check that the Test switch is set to Normal Go to MAP 0200, Entry Point C
Communication slow	Input inhibit remains on longer than usual NOTE: This may be caused by an increase in the host system work load	Go to MAP 3003, Entry Point A
OPERATOR PANEL		
LEDs	Only one LED fails	Use MIM 0320 to isolate failure
CE tests cannot be run and CSU cannot be selected	Will not go into Test status	Test switch circuit failure Use MIM 0320 to isolate failure
Always powers on in CSU mode	Will always be in Test status	Test switch circuit failure. Use MIM 0320 to isolate failure

(Step 019 continues)

(Step 019 continued)

ATTACHED WORK STATION PROBLEMS

This section is to be used only after verifying that no problems have been detected by the controller and attached work station diagnostics.

MAJOR SYMPTOM	MINOR SYMPTOM	ACTION
System Available off	No free-key mode	Go to MAP 0200, Entry Point A
Characters displayed do not match the key pressed.	System Available LED on	Go to MAP 0200, Entry Point D
Free-key mode fails	System Available LED on	Go to MAP 0200, Entry Point D
MSR and/or Light Pen feature(s)	Do(es) not operate correctly	Go to MAP 0200, Entry Point D
Self-check	Does not operate correctly	Go to MAP 0200, Entry Point D
Others		Go to MAP 0200, Entry Point A

Did you find the symptom in the symptom index?

Y N

020
Go to MAP 0200, Entry Point A.

021
-Perform the indicated repair action.
Go to Verify MAP 0400, Entry Point A.

MAIN MAP 0200

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	2	001
0100	B	2	002
0100	C	8	063
0100	D	15	130
0100	E	15	136

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
7	054	0700	A
6	050	0900	A
19	173	0900	A
15	128	0900	B
15	133	0900	B
7	051	0901	A
15	127	0901	A
19	174	0901	A
7	051	0902	A
15	127	0902	A
19	174	0902	A
14	121	1000	A
12	104	1000	B
14	117	1000	B
10	087	1001	A
10	088	1001	A
13	112	1001	B
9	076	1001	B1
10	082	1001	B1
12	103	1001	B1
12	099	1001	B2
12	096	3001	A
12	101	3001	A
13	110	3001	A
12	102	3002	A
13	111	3002	A
9	075	3004	A
10	081	3004	A

001
(Entry Point A)

- Power off.
- Set the Test switch to Normal.
- If the DDSA card is installed at socket C1 (MIM 1064), disconnect the communication cable from the Channel Service Unit before powering on.
  NOTE: This will cause a 0040 error after power on in normal mode. Reset the error and continue.
- At least one display station is attached and powered on. Ensure that the display station is in ready condition.
- Power on.

The internal diagnostics program runs each time the controller is powered on.

Is the Ready LED on?
Y N

The Ready LED on indicates that power-on diagnostics have been completed.

002
(Entry Point B)

Is error code DXXXXX displayed?
Y N

A DXXXXX error code indicates a power-on diagnostics error.

003
Is the Power LED on?
Y N

004
Is the fan running?
Y N

005
- Power off.

DANGER

If you are not careful, you could receive an electrical shock while performing the following procedure(s).

Is the AC fuse OK (MIM 0112)?
Y N

7 7 4 3 3 3
A B C D E F

006
Replace the fuse.
Go to Verify MAP 0400, Entry Point A.

007
- Measure the voltage at the customer power outlet.

Is the AC voltage present and inside the limits (MIM 0220)?
Y N

008
Report the AC voltage problem to the customer.
- Reconnect the communication cable at the Channel Service Unit if the DDSA card is installed.

009
- Power off.
- Unplug the line cord from the controller.
- Check the continuity of the line cord.

Is the line cord OK?
Y N

010
Replace the line cord.
- Reconnect the communication cable at the Channel Service Unit if the DDSA card is installed.
Go to Verify MAP 0400, Entry Point A.

011
Replace the internal AC cable assembly.
- Reconnect the communication cable at the Channel Service Unit if the DDSA card is installed.
Go to Verify MAP 0400, Entry Point A.

012
Is the System Available indicator on at any attached work station?
Y N

013
- Power off.
- Remove all cards except the planar.
- Power on.

Is the Power LED on?
Y N

4 4
G H J

J

014
- Measure the voltage between from pin 1 to pin 2 at the power supply AC connector (MIM 0210).

DANGER

If you are not careful, you could receive an electrical shock while performing the following procedure(s).

Is the AC voltage present?
Y N

015
Replace the internal AC cable assembly.
Go to Verify MAP 0400, Entry Point A.

016

Is the AC voltage inside the limits (MIM 0220)?
Y N

017
Report to the customer that the AC voltage is out of tolerance.
- Reconnect the communication cable at the Channel Service Unit if the DDSA card is installed.

018
- Power off.
- Reinstall the removed cards and remove the planar.
- Remove the access panel from the bottom of the machine.
- Power on.
- Measure the +5 V at A2D03.

Is +5 V present?
Y N

4 4
K L

019
- Power off.
- Remove all cards and the power supply.
- Measure the resistance from each voltage pin to the ground pins at the DC power supply connector on the logic board (MIM 0230).
  Resistance of less than 100K indicates a ground.

Is the resistance less than 100K for any voltage line?
Y N

020
Replace the power supply (MIM 0240)
Go to Verify MAP 0400, Entry Point A.

021
Replace the logic board (MIM 0640).
Go to Verify MAP 0400, Entry Point A.

022
Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
Go to Verify MAP 0400, Entry Point A.

023
Reinstall the removed cards one at a time and power on after each replacement. Replace the card that causes the Power LED to go off or remain off.
Go to Verify MAP 0400, Entry Point A.

024
Use MIM 0320 to isolate the cause of the Power LED failure.
Go to Verify MAP 0400, Entry Point A.

025
Is the fan running?
Y N

026
- Measure the voltage at the fan AC connector (MIM 0242).

Is the AC voltage present?
Y N

M N P

M N P

027
An internal AC cable problem has caused a fan failure which has caused a logic failure. Replace the internal AC cable assembly (MIM 0241) and return to Entry Point A of this MAP.

028
Overheating caused by a fan failure has also caused a logic failure. Replace the fan (MIM 0242) and return to Entry Point A of this MAP.

029
Is the Work Station Active LED on?
Y N

030
- While you do the next procedure, observe the control panel LEDs. All LEDs are set on for approximately 1 second by the '-POR' line from the planar for a lamp test.

NOTE: Ignore the condition of the LEDs after the first three seconds.
- Power off.
- Wait 5 seconds, then power on.

During the power-on sequence,does the Power LED go on and remain on and the other LEDs go on for approximately one second and then go off?
Y N

031
- Power off.
- Remove the access panel from the bottom of the machine.
- Connect the Logic Probe power leads:
  Red lead to any D03 (+5 V)
  Black lead to any D08 (Gnd)
- Connect the Logic Probe ground lead to any D08 (Gnd).
- Probe the '-POR' line at A2B12

Is the line at a down level for approximately 1 second when the 5294 is powered on?
Y N

6 5 5 5
Q R S T

032

Check the '-POR' line for open or ground on the logic board between A2B12 and power supply connector B1 (MIM 0611).

If there is an open or ground on the logic board, replace the logic board (MIM 0640).

If there is no open or ground on the logic board, replace the power supply (MIM 0240).

Go to Verify MAP 0400, Entry Point A.

033

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
Go to Verify MAP 0400, Entry Point A.

034

- Power off.
- Remove all cards from sockets C5, C7, D5, and D7.
- Remove the X.21 jumper from position L on the planar, if installed (MIM 0410).
- Power on.
- Wait 10 seconds for power-on diagnostics to be completed.

Is the Ready LED on now?

Y N

035

- Power off.
- Remove the access panel from the bottom of the machine.
- Connect the Logic Probe power leads:
  Red lead to any D03 (+5 V)
  Black lead to any D08 (Gnd)
- Connect the Logic Probe ground lead to any D08 (Gnd).
- Probe the '-clock POR' line at A2B13.
- Power on.

Is the line at a down level for approximately 0.5 second when the 5294 is powered on?

Y N

6 U V W

036

Check the '-clock POR' line for open or ground on the logic board between A2B13 and power supply connector A1 (MIM 0611).

If there is an open or ground on the logic board, replace the logic board (MIM 0640).

If there is no open or ground on the logic board, replace the power supply (MIM 0240).
Go to Verify MAP 0400, Entry Point A.

037

- Power off.
- Probe the '-reset bus' line at A4B10.
- Power on.

Is the line at a down level for approximately 1 second when the 5294 is powered on?

Y N

038

- Power off.
- Remove the driver/receiver cards at C3 and C4.
- Probe the '-reset bus' line at A4B10.
- Power on.

Is the line at a down level for approximately 1 second when the 5294 is powered on?

Y N

039

- Power off.
- Remove all cards and cables from the logic board.
- Check for a ground at A4B10.

Is there a ground?

Y N

040

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
Go to Verify MAP 0400, Entry Point A.

041

Replace the logic board (MIM 0640).
Go to Verify MAP 0400, Entry Point A.

6 6
X Y

042

Reinstall the removed cards one at a time and power on after each replacement. Replace the card that causes a failure.
Go to Verify MAP 0400, Entry Point A.

043

- Measure the following voltages:
  - -5 V at A1B06
  - +8.5 V at A2B11

Are the DC voltages present?

Y N

044

- Power off.
- Remove the power supply (MIM 0240).
- Check the failing voltage line for an open between socket A1 or A2 and power supply connector A10 or A8 (MIM 0611).

If there is an open or ground on the logic board, replace the logic board (MIM 0640).
If there is no open or ground on the logic board, replace the power supply (MIM 0240).
Go to Verify MAP 0400, Entry Point A.

045

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
Go to Verify MAP 0400, Entry Point A.

046

Reinstall the removed cards one at a time and power on after each one. Replace the card that causes the Ready LED to go off or remain off.
When reinstalling a feature ROS card with the X.21 Switched support feature, the X.21 jumper (position L) must be installed at the same time.
If the failing card is a patch card and you receive a new planar, the new planar is a replacement for both the patch card and the planar.
Go to Verify MAP 0400, Entry Point A.

Q
4

047

- While you do the next procedure, observe the control panel LEDs. All LEDs are set on for approximately 1 second by the '-POR' line from the planar for a lamp test.

NOTE: Ignore the condition of the LEDs after the first three seconds.

- Power off.
- Wait 5 seconds, then power on.

During the power-on sequence,does the Power LED go on and remain on and the other LEDs go on for approximately one second and then go off?

Y N

048

Use MIM 0320 to isolate the cause of Ready LED failure.
Go to Verify MAP 0400, Entry Point A.

049

- Power off.
- Disconnect all twinaxial connectors at the I/O panel of the controller.
- Power on.

Is the Ready LED on now?

Y N

050

Go To Map 0900, Entry Point A.

7
Z

051

Either an attached work station is failing or the cable from the controller to the work station is defective.

- Connect the cables one at a time and power on after each connection. The cable that causes an error when connected or one of the work stations attached to that cable is the cause of the problem.
- Possible causes are:
  Open or short circuit in cable.
  Open or short circuit in station protector (if used),
  Cable not terminated,
  A work station is transmitting continuously.
- Power off each work station attached to the failing cable one at a time, then power off, wait 5 seconds, and power on the 5294 to locate the failing work station. If the problem is still present with all attached work stations powered off, suspect a cable problem, work station termination, or environmental noise.

If twinaxial cable is used,
Go To Map 0901, Entry Point A.

If IBM Cabling System cable is used,
Go To Map 0902, Entry Point A.

052

Is error code D2XXXX displayed?

Y N

053

Find the displayed error code in the following table and go to the entry point shown.

ERROR CODE	PAGE	STEP NUMBER	ENTRY POINT
D3XXXX	8	067	AB
D4XXXX	8	067	AB
D5XXXX	8	067	AB
D6XXXX	8	067	AB
D7XXXX	19	170	AC
D8XXXX	8	067	AB
D9XXXX	14	121	AD
DAXXXX	10	079	AE
OTHER	19	175	AF

A
A

A A
2 A

054

Go To Map 0700, Entry Point A.

055

Is the fan running?

Y N

056

- Measure the voltage at the fan AC connector (MIM 0242).

Is the voltage present?

Y N

057

Replace the internal AC cable assembly (MIM 0241).

Go to Verify MAP 0400, Entry Point A.

058

Replace the fan (MIM 0242).

Go to Verify MAP 0400, Entry Point A.

059

- While you do the next procedure, observe the control panel LEDs.
- Power off.
- Wait 5 seconds, then power on.

Do all LEDs go on and remain on constantly when 5294 is powered on?

Y N

1
8 8
A A
B C

060
Reset any displayed code.

A failing work station is a work station that has one or more of the following conditions:
No system available
Failure in free-key mode.
An operator reported keyboard, display, printer, or an Expanded Function feature problem.
Answer NO to the following question if the only problem is a failure to communicate with the host system or a 004X, 005X, 0099, 1XXXXX, or 2XXXXX code displayed.

Are one or more attached work stations failing?
Y N

061
- While you do the next procedure, observe the control panel LEDs. All LEDs are set on for approximately 1 second by the '-POR' line from the planar for a lamp test.

NOTE: Ignore the condition of the LEDs after the first three seconds.
- Power off.
- Wait 5 seconds, then power on.

During the power-on sequence,does the Power LED go on and remain on and the other LEDs go on for approximately one second and then go off?
Y N

062
Use MIM 0320 to isolate the cause of the LED failure.
Go to Verify MAP 0400, Entry Point A.

063
(Entry Point C)

Is the EIA card or the DDSA card installed (MIM 1064)?
Y N

14 AD
11 AE
AF

A
F

064
- Power off.
- Disconnect the communication cable from the DCE (modem) and connect to the wrap connector; then connect the other end of the wrap connector to the DCE.
- See MIM 1052.
- If the diode assembly is not present in the I/J jumper position of the XLCA card, remove the jumper from the I position and install the jumper in the J position.
- Ensure that the DCE is powered on and in normal operating mode.

NOTE: This test with the XLCA card will not run unless the DCE is connected and supplying clock signals for the work station controller.

- Power on.
- Enable wrap level 2 by selecting CE test 62 (MIM 2012).
- Press the Enter key to start the test.
- Wait until the test has run 10 times or until an error occurs before answering the question.

Is error code 62XXXX (not 620000) displayed?
Y N

065
- The X.21 Switched Support feature is installed if ROS module P/N 2452080 is present in position 2 of the Feature ROS card at C5 (MIM 0710) or if ROS IDs of both 4X and 5X are displayed in the ROS ID line of screen C1 (MIM 2013).

Is the X.21 Switched Support feature installed?
Y N

066
Does the Comm Line Sync LED flash while the test is running?
Y N

067
(Entry Point AB)
Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
Go to Verify MAP 0400, Entry Point A.

10 AG
9 AH
9 AJ

068
Go to Page 11, Step 092, Entry Point C2.

069
- Power off.
- Disconnect the communication cable from the DCE and connect it to the wrap connector; then connect the other end of the wrap connector to the DCE.
- Ensure that the DCE is powered on and in normal operating mode.

NOTE: This test with the XLCA card will not run unless the DCE is connected and supplying clock signals for the work station controller.

- Power on.
- Enable wrap level 3 by selecting CE test 63 (MIM 2012).
- A 640004 code will be displayed to indicate that the wrap connector must be installed.
- Press the Enter key to start the test.
- Wait until the test has run 10 times or until an error occurs before answering the question.

Is error code 63XXXX (not 630000) displayed?
Y N

070
Does the Comm Line Sync LED flash while the test is running?
Y N

071
Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
Go to Verify MAP 0400, Entry Point A.

10 AK
AL

072
- Remove the wrap connector if installed.
- Reconnect the communication cable to the DCE.
- To perform this test, set the DCE for a local wrap by using the operator control on the DCE operator panel (this may be marked LL or T1).

- If the DCE does not have a local wrap function, answer NO to the following question.
- If the DCE does have a local wrap function, enable wrap level 4 by selecting the CE test 64 (MIM 2012).

- A 640005 code will be displayed to indicate that the DCE must be set for a local wrap.
- Press the Enter key to start the test.

Is error code 64XXXX (not 640000) displayed?
Y N

073
- Reconnect the communication cable at the DCE.
- Attempt to establish communications with the host system.

Does the Comm Line Sync LED flash?
Y N

074
- Check the EC level of the external communication cable.

Is the cable at EC level 834326?
Y N

075
Online communication failure.
- Set the Test switch on the controller to Normal.
- Power off, wait 5 seconds, then power on.
- Check the PLE error log (MIM 2013, test C2).
Go To Map 3004, Entry Point A.

076
Go To Map 1001, Entry Point B1.

10 AM
10 AN

A
N
9

077

- Run the display verification section of the online tests to determine if communication with the host system is possible.
- To run the online test:
  - At the sign-on screen, press the Cmd key, then press the Test Request key (or press and hold down the Alt key, and press the Test key) on the attached display station.

    The Online Verification menu will be displayed.
  - Select the Link Test, if permitted by the host system for your configuration or select the Display Verification test (MIM 2014).

Did the online test run correctly?

Y N

078

- Power off.
- Set the Test switch on the controller to Test.
- Power on.
- After power-on diagnostics have been completed, press the Cmd and Test Request keys on an attached display station.
- A configuration table will be displayed (MIM 0460).
- Check that the 5294 station address is correct and that the communications configuration displayed matches the actual configuration.

Is the configuration OK?

Y N

079

(Entry Point AE)

Correct the configuration record (MIM 0460) and attempt the failing operation again.

Go to Verify MAP 0400, Entry Point A.

080

- Check the EC level of the external communication cable.

Is the cable at EC level 834326?

Y N

A A A
P Q R

A A A A A A
G K M P Q R
8 9 9

081

Online communication failure.

- Set the Test switch on the controller to Normal.
- Power off, wait 5 seconds, then power on.
- Check the PLE error log (MIM 2013, test C2).

Go To Map 3004, Entry Point A.

082

Go To Map 1001, Entry Point B1.

083

Does a failure occur every time the customer attempts a specific job?

Y N

084

No failure was found.

- If the failure still occurs, use Backup MAP 0300.
- If the failure is intermittent, check the HE log (MIM 2013, test C1) and PLE error log (MIM 2013, test C2) and go to MAP 0300, Entry Point A.
- Return the controller to its normal setup.

085

Report to the customer that the failure appears to be a host system problem, probably a programming error.

- Return the controller to its normal setup.

086

The DCE is failing.

- Report to the customer the failure indicated by the displayed 64XXXX error code that you recorded.
- Return the controller to its normal setup.
- Power on.

087

Go To Map 1001, Entry Point A.

088

Go To Map 1001, Entry Point A.

089

- Power off.
- Disconnect the communication cable from the DCE (modem) and install the wrap connector at the end of the communication cable.
- Power on.
- Enable wrap level 3 by selecting CE test 63 (MIM 2012).
- A 630004 code will be displayed to indicate that the wrap connector should be installed.
- Press the Enter key to start the test.

Is error code 63XXXX (not 630000) displayed?

Y N

090

Does the Comm Line Sync LED flash while the test is running?

Y N

091

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
Go to Verify MAP 0400, Entry Point A.

092

(Entry Point C2)

- Remove the wrap connector if installed.
- Reconnect the communication cable to the modem/DCE.
- See the table at the right to determine if Wrap 4 can be run.
- Enable wrap level 4 by selecting the CE test 64 (MIM 2012).

NOTE: If a 640005 code is displayed, set the modem/DCE to the position for a local loopback (LL) or an analog loopback (AL); then press the Enter key to start the test.
If the wrap 4 test cannot be run on the attached modem/DCE, answer NO to the following question.

Is error code 64XXXX (not 640000) displayed?

Y N

Comm Card	EIA	DDSA	XLCA
Wrap 4 (DCE)	Note 1	Not available	Note 2

NOTES:

1. CE test 64 can be run on all IBM 386X or 387X modems and other modems/DCEs that support a wrap controlled by interface pin 18 (MIM 0460.4) or by a modem/DCE operator switch.
   See MIM 1030 for more information.
2. To perform this test, set the DCE for a local wrap by using the operator control on the DCE operator panel. If the DCE does not have a local wrap function, wrap 4 cannot be performed.

14AS 14AT 12AU

5294

MAP 0200

093
- Reconnect the communication cable at the DCE or Channel Service Unit.
- Attempt to establish communications with the host system.

Does the Comm Line Sync LED flash?
Y N

094
Is the EIA card installed (MIM 1064)?
Y N

095
Is the XLCA card installed (MIM 1064)?
Y N

096
Online communication failure.
- Set the Test switch on the controller to Normal.
- Power off, wait 5 seconds, then power on.
- Check the PLE error log (MIM 2013, test C2).

Go To Map 3001, Entry Point A.

097
- Check the EC level of the external communication cable.

Is the cable at EC level 834326?
Y N

098
Is this machine a Model K01 or S01?
Y N

099
Go To Map 1001, Entry Point B2.

1 3 A V A W A X A Y

A W A X A Y

100
- The X.25 Support feature is installed if ROS module P/N 2452371 is present in position 2 of the Feature ROS card at C5 (MIM 0710) or if a ROS ID of 4X appears twice in the ROS ID line of screen C1 (MIM 2013).

Is the X.25 Support feature installed (MIM 0710)?
Y N

101
Online communication failure.
- Set the Test switch on the controller to Normal.
- Power off, wait 5 seconds, then power on.
- Check the PLE error log (MIM 2013, test C2).

Go To Map 3001, Entry Point A.

102
Online communication failure.
- Set the Test switch on the controller to Normal.
- Power off, wait 5 seconds, then power on.
- Check the PLE error log (MIM 2013, test C2).

Go To Map 3002, Entry Point A.

103
Go To Map 1001, Entry Point B1.

104
Go To Map 1000, Entry Point B.

105
- Run the display verification section of the online tests to determine if communication with the host system is possible.
- To run the online test:
  - At the sign-on screen, press the Cmd key, then press the Test Request key (or press and hold down the Alt key, and press the Test key) on the attached display station.
    The Online Verification menu will be displayed.
  - Select the Link Test, if permitted by the host system for your configuration or select the Display Verification test (MIM 2014).

Did the online test run correctly?
Y N

106
- Power off.
- Set the Test switch on the controller to Test.
- Power on.
- After power-on diagnostics have been completed, press the Cmd and Test Request keys (or press and hold down the Alt key, and press the Test key) on an attached display station.
- A configuration table will be displayed (MIM 0460).
- Check that the 5294 station address is correct and that the communications configuration displayed matches the actual configuration.

Is the configuration OK?
Y N

107
Correct the configuration record (MIM 0460) and attempt the failing operation again.

108
Is the XLCA card installed (MIM 1064)?
Y N

109
- The X.25 Support feature is installed if ROS module P/N 2452371 is present in position 2 of the Feature ROS card at C5 (MIM 0710) or if a ROS ID of 4X appears twice in the ROS ID line of screen C1 (MIM 2013).

Is the X.25 Support feature installed (MIM 0740)?
Y N

110
Online communication failure.
- Return the controller to its normal setup.
Go To Map 3001, Entry Point A.

111
Online communication failure.
- Return the controller to its normal setup.
Go To Map 3002, Entry Point A.

112
Go To Map 1001, Entry Point B.

113
Does a failure occur every time the customer attempts a specific job?
Y N

114
No failure was found.
- If the failure still occurs, use Backup MAP 0300.
- If the failure is intermittent, check the HE log (MIM 2013, test C1) and PLE error log (MIM 2013, test C2) and go to MAP 0300, Entry Point A.
- Return the controller to its normal setup.

115
Report to the customer that the failure appears to be a host system problem, probably a programming error.
- Return the controller to its normal setup.

116
- Record the 64XXXX error code.
- Disconnect the communication cable at the I/O panel.
- Do not connect the wrap connector.
- Select CE/CSR test 63.
- Ignore the 630004 prompting code.
- Press the Enter key to start the test.

NOTE: This checks for a failure of the '-wrap 2 control' line.

Is error code 63XXXX (not 630000) displayed?
Y N

117
Go To Map 1000, Entry Point B.

118
The modem/DCE is failing.
- Report to the customer the failure indicated by the displayed 64XXXX error code that you recorded.
- Return the controller to its normal setup.
- Power on.

119
- Power off.
- Remove the wrap connector at the DCE end of the communication cable.
- Disconnect the communication cable at the I/O panel and connect the wrap connector to the 25-pin connector on the I/O panel.
- Power on.
- Enable wrap level 3 by selecting CE test 63 (MIM 2012).
- A 630004 code will be displayed to indicate that the wrap connector should be installed.
- Press the Enter key to start the test.

Is error code 63XXXX (not 630000) displayed?
Y N

120
Replace the external communication cable.
Go to Verify MAP 0400, Entry Point A.

B
C

A B
D C
8

121
(Entry Point AD)
There is a failure in the planar, the communication card, or the internal communication cable.
Go To Map 1000, Entry Point A.

122
Is the System Available indicator continuously on at the failing work station?
Y N

123
- Power off the controller
- Set the Test switch to Test.
- Power on.

Is the System Available indicator continuously on at the failing work station now?
Y N

124
- Power off.
- Disconnect all twinaxial connectors at the I/O panel of the controller.
- Move the cable for the failing work station to a different port on the controller.
- Power on.

Is the System Available indicator continuously on at the failing work station now?
Y N

125
- Power off.
- Install a jumper between J5-1 and J5-2 on the planar (MIM 0410).
- Set the Test switch to Normal.
- Power on.
- Power-on diagnostics should loop now. This is indicated by the Ready LED flashing at 5 to 10 second intervals.

Are the power-on diagnostics looping?
Y N

1 1 1 1 1
5 5 5 5 5
B B B B B
D E F G H

BD14 BE14 BF14 BG14 BH14

126
- Remove the jumper installed between J5-1 and J5-2 on the planar (MIM 0410).
Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

127
Either an attached work station is failing or the cable from the controller to the work station is defective.
- Remove the jumper installed between J5-1 and J5-2 on the planar (MIM 0410).

If twinaxial cable is used,
Go To Map 0901, Entry Point A.

If IBM Cabling System cable is used,
Go To Map 0902, Entry Point A.

128
One of the following is failing:
Driver/receiver card
Planar
Internal I/O cable
Logic board
To isolate to a single FRU:
Go To Map 0900, Entry Point B.

129
Correct the configuration record (MIM 0460) and attempt the failing operation again.

Go to Verify MAP 0400, Entry Point A.

130
(Entry Point D)

Is the failing work station a printer?
Y N

131
- Record and reset any error.

Does free-key mode operate on the failing display station?
Y N

18BJ BK BL

BK BL

132
Is the problem wrong characters displayed?
Y N

133
One of the following is failing:
Driver/receiver card
Planar
To isolate to a single FRU:
Go To Map 0900, Entry Point B.

134
The failure is in the attached work station. Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.
Go to Verify MAP 0400, Entry Point A.

135
Is the problem wrong characters displayed?
Y N

136
(Entry Point E)
Is the problem a 0086 error when attempting to perform an MSR, light pen, self-check operation, or use a printer that requires the Extended Function A feature (IPDS printers)?
Y N

137
Does correct operation using the Text Entry Assist or Text Entry Assist "A" feature result in an operator error code of 0072 through 0078?
Y N

138
Is the reported problem a self-check failure?
Y N

139
Is the reported problem an MSR failure?
Y N

17BM 17BN 17BP 17BQ 16BR 16BS

BS15

140
Is the reported problem a light pen failure?
Y N

141
Does correct operation result in an operator error code of 0000 through 0029, 0060 through 0066, or 0071?
Y N

142

- If the error code is 0067, 0068, or 0069, the cause is probably a host system programming problem.
- If the error code is any other valid error code (MIM 2010) go to MAP 0100, Entry Point A.
- If the error code is not listed in MIM 2010 a probable work station controller planar failure is indicated (MIM 0740).

143
- Read the error code definition (MIM 2110).
- If the attempted operation needs a feature on the controller and/or the display station ensure that the feature is installed.
- Check that the attempted operation works correctly for the online tests (MIM 2014) or free key mode (MIM 2011).

Does the failing operation work correctly in the online verification test or free key mode?
Y N

144
The failure is in the attached work station. Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.

145
Probable host system programming problem.

BT

BR15 BT

146
- Key in a line of characters while in free-key mode or with the verification test menu displayed. Place the light pen tip on any character. An error code of 0036 should be displayed.
- Remove the light pen from the screen.
- Press the Reset key.
- Press the Field Exit key.
- Place the light pen tip over a row of characters and slowly move along the row.
- The cursor should follow the light pen movement + or - 2 positions.
- Place the light pen tip over a character and press the light pen tip against the screen to activate the tip switch. An error code of 0037 should be displayed.

Did the light pen check out OK?
Y N

147
The failure is probably in the attached work station. Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.
If no failure is found in the work station, replace the Expanded Function feature ROS module and/or the Feature ROS card (MIM 0740 and 0741).
Go to Verify MAP 0400, Entry Point A.

148
The failure is caused by operator error or a host system programming problem.
Go to Verify MAP 0400, Entry Point A.

149
- Pass the MSR test card through the reader while in free-key mode or with the Online Verification Test Prime Option menu displayed?

Does the MSR test card read correctly when used in free-key mode or in the free key field on the verification menu?
Y N

17BU 17BV

150
The failure is probably in the attached work station. Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.
If no failure is found in the work station, replace the Expanded Function feature ROS module and/or the Feature ROS card (MIM 0740 and 0741).
Go to Verify MAP 0400, Entry Point A.

151
The failure is caused by an operator error, a defective MSR card, or a host system programming problem.
Go to Verify MAP 0400, Entry Point A.

152
- Select the Specified Input Field screen of the online verification tests.
- Field Advance to the self-check fields.
- Enter AF127656 in the 1st self-check field.
- Enter AF127655 in the 2nd self-check field.

Is error code 0015 displayed after entering the number given for either self-check field?
Y N

153
The failure is caused by entry of the wrong check digits or a host system programming problem.
Go to Verify MAP 0400, Entry Point A.

154
Replace the Expanded Function feature ROS module (MIM 0741).
If the failure continues, replace the Feature ROS card in socket C5 (MIM 0740).
Go to Verify MAP 0400, Entry Point A.

155
Replace both of the Text Entry Assist feature or Text Entry Assist "A" feature ROS modules (MIM 0741).
If the failure continues, replace the Feature ROS card in socket C5 (MIM 0740).
Go to Verify MAP 0400, Entry Point A.

156

Is the Expanded Function or Extended Function A feature ROS module installed (MIM 0710)?
Y N

157
The MSR, light pen, self-check, and copy-to-print functions cannot be used unless the Expanded Function feature is installed on the controller.

- Set the Test switch on the controller to Normal.
- Power off.

Go to Verify MAP 0400, Entry Point A.

NOTE: IPDS printers cannot be used unless the Extended Function A feature is installed.

158
Replace the Expanded Function feature ROS module (MIM 0741).
If the failure continues, replace the Feature ROS card in socket C5 (MIM 0740).
Go to Verify MAP 0400, Entry Point A.

159
- Power off.
- Set the Test switch on the controller to Test.
- Power on.
- After power-on diagnostics have completed press the Cmd and Test Request keys on an attached display station.
- A configuration table will be displayed (MIM 0460).
- Check that the country ID for each display station is correct.

Does the configuration displayed match the actual configuration of the attached display stations?
Y N

160
Correct the configuration record (MIM 0460) and attempt the failing operation again.
- Press the Error Reset key on the terminal to exit customer setup mode.
- Set the Test switch on the controller to Normal.
- Power off.

Go to Verify MAP 0400, Entry Point A.

18BW

161

- Exit the customer setup mode.
- See the display station maintenance publications and check the display station for correct scan code generation.

Is the display station scan code generation correct?

Y N

162

The failure is in the attached work station. Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.

- Set the Test switch on the controller to the Normal.
- Power off.

Go to Verify MAP 0400, Entry Point A.

163

Replace the feature translate card in socket C7 if the card is present (MIM 0113).

If no card is installed in socket C7, replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

Go to Verify MAP 0400, Entry Point A.

164

- Check the address switch setting on the printer and check the configuration (MIM 0460).
- If a failure is still present, it is probably a printer problem.
- Repair the failing printer or report the problem to the customer for printers that do not have IBM on-site service.

Is error code 0086 being displayed? If so, go to Entry Point E.

A
B
7

165

- Power off.
- Remove the planar.
- Remove the access panel from the bottom of the machine.
- Connect the Logic Probe power leads:
  Red lead to any D03 (+5 V)
  Black lead to any D08 (Gnd)
- Connect the Logic Probe ground lead to any D08 (Gnd).
- Power on.
- Probe the '-POR' line at A2B12 and the '-clock POR' line at A2B13.

Is either line at a down level?

Y N

166

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

Go to Verify MAP 0400, Entry Point A.

167

- Power off.
- Remove the communication card.
- Power on.
- Probe the line that was at a down level.

Is the line at a down level now?

Y N

168

Replace the communication card (MIM 1040).

Go to Verify MAP 0400, Entry Point A.

169

Check the line that was at a down level for a ground on the logic board (MIM 0611).

If there is an open or ground on the logic board, replace the logic board (MIM 0640).

If there is no open or ground on the logic board, replace the power supply (MIM 0240).

Go to Verify MAP 0400, Entry Point A.

001

(Entry Point A)

All problems must be started at Start of Call MAP 0100.

This MAP has three sections:

1. An index of possible causes listed by error code in order of probability.
2. An index of possible causes listed by major symptom in order of probability.
3. An error log table, which uses the ERAP error log (MIM 2050) or the error log buffer (MIM 2013).

NOTES:

1. If more than one FRU is listed in the probable cause column, perform one FRU replacement per call and record the date.
2. If a cable is listed as the probable cause, attempt to reseat the cable before replacing it.
3. When a logic FRU is listed as the probable cause, reseat the card and check all associated cables before replacing the FRU.
4. If two or more symptoms are reported as occurring at different times, attempt to isolate the failure by finding which FRUs are common to all symptoms or by using the symptom that occurs most often.
5. All references to twinaxial cable in this MAP include both twinaxial cable and the IBM Cabling System cable.

- Look for the error in the index.

(Step 001 continues)

(Step 001 continued)

SYSTEM REFERENCE CODE INDEX

OPERATOR ERROR CODES

ERROR CODE	ADDITIONAL INFORMATION	PROBABLE CAUSE
0001 through 0029	Occurs during correct operation or entry.	Attached display station Planar (for 0002 only, also feature translate card at C7 if installed)
0031 through 0035	Occurs during correct operation of MSR	MSR media Attached display station Expanded function feature ROS module (pos.#1) on Feature ROS card at C5 Planar
0036 or 0037	Occurs during correct operation of the light pen with valid light pen entry fields	Attached display station Expanded function feature ROS module (pos.#1) on Feature ROS card at C5 Planar
004X or 005X or logged 006X	Use error code 004X or 005X to enter table under logged device error codes	Go to communication error code section page 10 in this MAP
0060 through 0071 (displayed errors on model K01 and S01 only)	0060 through 0066 during correct operation	Attached display station Host system programming Planar
	0067 through 0071	Host system programming
0070 through 0078 (valid only when Text Entry Assist feature installed)	Normally a message will be displayed without a code for these errors. The code will be displayed when the Help key is used.	Attached display station Host system programming Text Entry Assist ROS module A (position 3) or module B (position 4) on Feature ROS card at C5 Planar

(Step 001 continues)

(Step 001 continued)

0086	Occurs when Expanded Function feature or Extended Function A feature is installed	Expanded Function and Extended Function A feature ROS module (pos.#1) on Feature ROS card at C5 Feature ROS card at C5 Planar
0080 through 0087 (not 0086)	Configuration error. Check work station configuration and CSU configuration entries (MIM 0460).	Translate card at C7 (if installed) Planar
0099	Occurs during correct operation. Host system or communication problem	Record PLE log entries and go to the error log table in this MAP If no log entries, go to MAP 3003, Entry Point A
10XXXX	Occurs during correct operation or entry	Wrong configuration X.25 ROS module (pos.#2) on ROS card at C5 Planar
1XXXXX (not 10XXXX)	Probable network problem Check error code lists for cause definition	X.25 ROS module (pos.#2) on Feat. ROS card at C5 Planar
20XXXX	Occurs during correct operation or entry	Wrong configuration X.21 ROS module (pos.#2) on Feat. ROS card at C5 Planar
2XXXXX (not 20XXXX)	Probable network problem Check error code lists for cause definition	X.21 ROS module (pos.#2) on Feat. ROS card at C5 Planar
Other	Occurs during correct operation	Attached display station Planar Driver/receiver card

(Step 001 continues)

(Step 001 continued)

DIAGNOSTIC ERROR CODES

ERROR CODE	ADDITIONAL INFORMATION	PROBABLE CAUSE
D11001	Power LED on All other LEDs off	Planar Feature ROS card/modules Power supply Logic board
D13002	Power and Ready LEDs on Work Station Active LED off	Driver/receiver card Twinaxial cable Attached work station Planar Logic board
D13003	Power and Work station Active LEDs on Ready LED off	Twinaxial cable Attached work station Driver/receiver card Planar Power supply Logic board
D20008	1. Only one module on Feature ROS card at C5	Feature ROS card at C5 Text Entry Assist feature ROS module B (pos.#4)
	2. Two or more modules on Feature ROS card at C5	Text Entry Assist feature ROS module B (pos.#4)
D20010 or D20020 or D20030	1. Only one module on Feature ROS card at C5	Feature ROS card at C5 Text Entry Assist feature ROS module A (pos.#3)
	2. Two or more modules on Feature ROS card at C5	Text Entry Assist feature ROS module A (pos.#3)
D20040 or D20080 or D200C0	1. Only one module on Feature ROS card at C5	Feature ROS card at C5 X.21 or X.25 feature ROS module (pos.#2)
	2. Two or more modules on Feature ROS card at C5	X.21 or X.25 feature ROS module (pos.#2)

(Step 001 continues)

(Step 001 continued)

D20100	1. Only one module on Feature ROS card at C5	Feature ROS card at C5 Expanded function feature ROS module (pos.#1)
	2. Two or more modules on feature ROS card at C5	Expanded function feature ROS module (pos.#1)
D20200	Power-on diagnostic error	Feature translate EPROM card at C7 if installed Planar
D20800 D21000 D22000 D24000 D28000	Power-on diagnostic error	Planar
D2XXXX not listed above	Power-on diagnostic error	Planar Feature ROS card at C5 Feature ROS modules in position 1,2,3, or 4 of the Feature ROS card Feature translate EPROM card at C7
D3XXXX D410XX D510XX D610XX D710XX	Power-on diagnostic error	Planar
D73YXX	Power-on diagnostic error during twinaxial interface test. Y in the SRC equals 1 to F and identifies the failing port(s)	Attached work station Twinaxial cable Driver/receiver card Planar Internal I/O cable Logic board
D77YXX	At least one error-free response was received from the port identified by the port identifier Y in the SRC	Attached work station Twinaxial cable Driver/receiver card Planar

(Step 001 continues)

(Step 001 continued)

DIAGNOSTIC ERROR CODES (continued)

ERROR CODE	ADDITIONAL INFORMATION	PROBABLE CAUSE
D810XX	Ensure that the planar is the correct type for the communication support feature installed.	Planar
D900XX	Number entered for communication card type is not valid	Correct communication card type in the configuration record
D910XX	Communication adapter test	Planar
D912XX D914XX	Communication adapter test	Communication card Planar Logic board
DA1060	1 | First time	Reenter configuration and attempt again
	2 | Second time	Planar
DXXXXX	Any other error code	Planar Power supply Logic board Feature ROS card/modules
EXXXXX	Error detected during operation	Planar
FXXXXX	Error detected during operation	Check EC load level for latest level If OK, replace planar If failure continues to occur, call for support

(Step 001 continues)

(Step 001 continued)

FAILURE SYMPTOM INDEX

When using observed symptoms, the minor symptom column can aid in isolating the failure cause. Also, review the internal error log or the error history table for entries that can aid in defining the failure cause.

MAJOR SYMPTOM		MINOR SYMPTOM	PROBABLE CAUSE
COMMUNICATIONS			
Comm Line Sync LED off	1	004X, 005X, or 0099	See entry for operator error codes
	2	No operator errors	Communication lost (see below)
Communication slow		Input inhibit on longer than usual. NOTE: This may be caused by host system work load increase.	Go to MAP 3003, Entry Point A
Communication with host system lost		The Comm Line Sync LED may be blinking if on a multipoint network.	Check PLE log. Use PLE log entries to enter the error log table in this MAP. If no PLE log entries are present, go to MAP 3003, Entry Point A
Communication can not be established to host system when controller first set up or after change in configuration		Check the following items: - same NRZ/NRZI option used at both ends - correct controller station address used - other communication configuration entries correct - system configuration matches actual remote cluster configuration	

(Step 001 continues)

(Step 001 continued)

LED INDICATIONS		
All LEDs off		Fuse Power supply Customer AC power Internal AC cable asm Planar or logic cards Logic board
Power LED on All other LEDs off		Planar Feature ROS cards Power supply Logic board
Power and Ready LEDs on Work Station Active LED off	All attached work stations must be powered on. The 5294 is not receiving or recognizing any response from the work stations.	Attached work station Twinaxial cable Driver/receiver card Planar Logic board
Power and Work Station Active LEDs on Ready LED off	Disconnect all twinaxial cables and power on again. If the Ready LED is on now a cable or work station is failing.	Twinaxial cable Attached work station Driver/receiver card Planar Power supply Logic board
Single LED failure	5294 works OK. All operations normal	LED assembly Planar

OTHER SYMPTOMS			
Power supply fuse blows	1	Occurs once	Power line disturbance Replace fuse
	2	Occurs more than once (check voltage distribution)	Suspect: Power supply
Symptoms not described			Power supply Planar

(Step 001 continues)

(Step 001 continued)

ATTACHED WORK STATION SYMPTOMS

This section is to be used only after ensuring that no problem has been detected by the controller or attached work station diagnostics. These are symptoms that are observed on the work stations.

MAJOR SYMPTOM	MINOR SYMPTOM	PROBABLE CAUSE
System Available off	No free-key mode	Twinaxial cable Driver/receiver card Internal I/O cable Planar Attached work station
System Available on	No character displayed when a key is pressed	Driver/receiver card Planar Logic board Attached work station
System Available on	Characters displayed do not match the key pressed Free key mode fails	Wrong configuration Feature translate ROS card at C7, if installed Planar
Light pen	Fails on all attached display stations	Feature ROS card at C5 Expanded function feature module on ROS card at C5
	Fails on some attached display stations, works correctly on others	Attached work station problem

(Step 001 continues)

(Step 001 continued)

ATTACHED WORK STATION SYMPTOMS (continued)

SYMPTOM	ADDITIONAL INFORMATION	PROBABLE CAUSE
System Available off or blinking and work station continuously resets (goes through power on cycle)	Fails on only one work station when more than one are attached to the same port and powered on	Attached work station
	Fails on two or more work stations attached to the same port. Works OK when only one of the failing work stations is powered on.	The failing work stations are responding to the same address. Either more than one work station is set for the same address or a failure of an attached work station is causing an address recognition failure
System Available off or blinking (the work station may also reset intermittently)	Fails on two or more work stations that have the same work station address and are attached to different ports. Data entered at or sent to one work station may be displayed at a work station with the same address on a different port.	Driver/receiver card Planar Logic board
System Available off or blinking and/or Line Sync off (including off intermittently) and/or Line Check on NOTE: Use only if preceding entries do not match	Fails on only one work station when more than one are attached to the same port	Twinaxial cable Attached work station Wrong configuration Driver/receiver card
	Fails on more than one work station or only one is attached to the port	Twinaxial cable Attached work station Wrong configuration Driver/receiver card Planar Internal I/O cable Logic board

(Step 001 continues)

(Step 001 continued)

Magnetic Stripe Reader (MSR)	Fails on all attached display stations	Feature ROS card at C5 Expanded function feature module on ROS card at C5 Attached work station
	Fails on some attached display stations, works correctly on others	Attached work station problem
Overstrike/hex key failure	Machine operates normally for all other functions	Wrong configuration Feature translate card at C7, if installed Planar
Self-check	Fails when correct check digits are entered	Feature ROS card at C5 Expanded function feature module on ROS card at C5 Attached work station
Wrong characters displayed	Check for correct country ID code in configuration record (MIM 0460)	Feature translate card at C7, if installed Planar
Other	Other attached work station failures when no internal problem with the work station can be found and system available is on at the failing work station	Attached work station (FRUs not tested by diagnostics) Twinaxial cable Driver/receiver card Internal I/O cable Planar Feature ROS card/modules
	Other work station failures when a possible cabling problem is indicated.	Twinaxial cable not terminated or terminating resistance connected at work stations other than the last work station (can occur with work stations that provide cable-thru as an option). Advise use of MIM 3001.

(Step 001 continues)

(Step 001 continued)

ERROR LOG TABLE

- Find the last error code from the error history table or the error log buffer (MIM 2013, test C2).
- Find the error code in the error column of the table below.
- The FRUs are listed under the probable cause column.

See error history table in MIM 2090 for more detailed information for the error codes.
Refer to MIM 2050 for a general description of the error log and MIM 2100 section for error codes.

COMMUNICATION ERROR CODES

This table indicates the possible causes for the communication error codes.

The possible causes are listed in order of probability for each communication feature.

Each possible cause is shown as a number that corresponds to a failure cause or FRU in the cause number list.

MAP 3003 may be used with all 004X, 005X, and 006X error codes to aid in isolating the failure.

Cause Number List

1. Communication card
2. External communication cable
3. Internal communication cable
4. Planar
5. Communication line/network
6. Modem/DCE
7. Host system
8. Configuration error
9. Power supply
10. X.25 or X.21 Switched Support feature

(Step 001 continues)

(Step 001 continued)

Error Code	EIA	XLCA	DDSA
0040	6,2,3,1,4,8,10	6,5,2,3,1,4,8,10	5,6,1,2,4,8
0041	5,6,2,3,1,4,8,10	6,5,2,1,3,4,10	5,1,2,4
0042	6,1,2,3,4	6,2,1,3,4	1,4
0043	6,1,4,8,9	8	8
0044	5,6,1,2,4,3,8	8	8
0045	6,5,4,10	6,5,4,10	
0046	6,4,10	6,4,10	
0047	6,4,10	6,4,10	
0050	6,2,4,1,3	6,2,4,1,3	1,4
0051	6,1,2,3,4	6,2,1,3,4	1,4
0052	4	4	4
0053	6,5,10	6,5,10	
0054	7,4,10	7,4,10	7,4
0055		6,1,4	
0062 0063	4	4	4
0064	5,6,1,2,3,4	5,6,1,2,3,4	5,1,2,3,4
0065 0066	6,1,2,3,4	6,1,2,3,4	5,1,4
0067 0068 0069	5,6,1,2,3,4	5,6,1,2,3,4	5,1,2,3,4
006A	7,5,6,10	7,5,6,10	7,5,6,10
006B		6,1,4	
006C	5,6,10	5,6,10	
006D	5,6,7,10	5,6,7,10	

(Step 001 continues)

(Step 001 continued)

LOGGED DEVICE ERROR CODES

ERROR CODE	ERROR NAME	ERROR DESCRIPTION	PROBABLE CAUSE
01XX or 02XX	Attached work station errors	Suspect a twinaxial cable problem for parity checks, line checks, etc. Suspect a 5294 problem only if no problems are found on the attached work station or with the twinaxial cable.	Driver/receiver card Planar Power supply

Did you find the failing FRU or did you replace a FRU for an intermittent problem?

Y N

002

- Use the information you have and the maintenance information manual for a free-lance approach.

003

- Record the FRU replaced, the symptoms, and the date.

VERIFY MAP 0400

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0200	A	1	001
0300	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
1	003	0100	A
2	005	0100	A
2	007	0100	A
2	009	0300	A

001

(Entry Point A)

- Power off.
- Replace the access panel at the bottom of the machine if removed earlier.
- Reconnect all disconnected feature(s) and cables.
- Set the Status switch to Normal.
- Wait 5 seconds, then power on.
- Attempt to repeat the original error.
- Verify that no new errors have occurred.

Does the original error still occur?
Y N

002
Does the 5294 power on without errors and operate correctly offline?
Y N

003
- Use the Start of Call MAP with the symptom you have now.

Go To Map 0100, Entry Point A.

2 2
A B

Correct operation for normal power-on sequence:
- Set the Test switch to Normal.
- Power on.
- All LEDs go on for about 1 second for a lamp test.
- All LEDs except Power go off.
- The Ready LED goes on when diagnostics have been completed.
- The Work Station Active LED goes on if any attached work station is powered on and responds to polling from the controller.
- The controller is now ready to operate once the communication link to the host system is established.

004

- Run the online test, select prime option 1 (MIM 2014).

Does the online test run correctly?

Y N

005

- Use the Start of Call MAP with the symptom you have now.

Go To Map 0100, Entry Point A.

006

- If necessary, run the customer application.
- If not necessary, take the yes (Y) leg of the following question.

Does the customer application function correctly now?

Y N

007

- Use the Start of Call MAP with the symptom you have now.

Go To Map 0100, Entry Point A.

008

End of call.

009

Go To Map 0300, Entry Point A.

ROS PROBLEM ISOLATION MAP 0700

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0200	A	1	001

001

(Entry Point A)

Is there a card in socket C5, C7, D5, or D7?
Y N

002
Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

003

- Record the display error code.

Up to 4 cards may be present in sockets C5, C7, D5, and D7. These can include an old style Feature ROS card, one or more Addressable Feature ROS cards, EPROM RPQ, translate, or patch cards.

Refer to MIM 0760 to identify the card types installed. Refer to MIM 0750 to determine if any planar ROS disable jumpers are needed when the module/card is installed.
Ensure that the module is installed correctly. (Refer to MIM 0760.)

Is there an old style feature ROS card in socket C5, C7, D5, or D7 (MIM 0760)?
Y N

004

(Entry Point B)

Is there an Addressable Feature ROS card in socket C5, C7, D5, or D7 (MIM 0760)?
Y N

5 4 2
A B C

A B C
1 1 1

005
(Entry Point C)

Is there a Feature Translate EPROM card in socket C5, C7, D5, or D7 (MIM 0760)?
Y N

006

Is there an EPROM patch card in socket C5, C7, D5, or D7 (MIM 0760)?
Y N

007

(Entry Point D)

- Refer to the RPQ documentation to see if any planar ROS disable jumpers were installed as part of the RPQ installation.
- Turn power off.
- Remove the RPQ card.
- Remove any planar ROS disable jumpers installed by the RPQ (MIM 0410).
- Turn power on and wait 10 seconds for power-on diagnostics to complete.

Is an error code displayed?
Y N

008
Replace the RPQ card.

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

009

Replace the planar (MIM 0440).

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

Reenter the configuration (MIM 0460).

010
- Turn power off.
- Remove the patch card.
- Remove the planar ROS disable jumpers installed with the patch card (MIM 0410).
- Turn power on and wait 10 seconds for power-on diagnostics to complete.

5 4 3
A B C

A B C
1 1 2

Is an error code displayed?
Y N

011
Replace the planar (MIM 0440) with the latest level planar.
Remove and return both the old planar and the patch card.

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

Reenter the configuration (MIM 0460).

012
Are there any cards remaining in sockets C5, C7, D5, or D7?
Y N

013
- Reinstall all removed cards and planar ROS disable jumpers.

Replace the planar (MIM 0440).

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

Reenter the configuration (MIM 0460).

014

Go to Page 1, Step 007, Entry Point D.

015
- Power off.
- Remove the Translate Feature EPROM card.
- Remove the planar ROS disable jumper at B, if installed (MIM 0410).
- Power on and wait 10 seconds for power-on diagnostics to complete.

Is an error code displayed?
Y N

016
- Reinstall the planar ROS disable jumper, if removed.

Replace the Feature Translate EPROM card (MIM 0740).

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

5 4 4
A B C

A B C
1 1 3

017
Are there any cards remaining in sockets C5, C7, D5, or D7?
Y N

018
- Reinstall all removed cards and planar ROS disable jumpers.

Replace the planar (MIM 0440).

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

Reenter the configuration (MIM 0460).

019

Go to Page 1, Step 005, Entry Point C.

020

Are there other cards installed or remaining in sockets C5, C7, D5, or D7?
Y N

021
(Entry Point E)

Either the Feature ROS card or a ROS module is failing.
Refer to the error code list in MIM section 2180. If the error code indicates a specific ROS module, check corresponding switch (MIM 0750) if Addressable Feature Card (MIM 0760). If switch setting is correct, then replace the ROS module first (MIM 0741).

If the error code does not indicate a specific ROS module, obtain an Addressable Feature ROS card and transfer all ROS modules to the new card (MIM 0741)

If a failure still occurs, remove the modules one at a time and power on after each removal. The failing module is the one removed just before the 5294 power-on sequence was OK (MIM 0741).

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

5 5
A B

022

- Turn power off.
- Remove the Addressable Feature ROS card. If more than one is installed, remove either one.
- Remove any planar ROS disable jumpers used with the ROS modules on the card (MIM 0750).
- Turn power on and wait 10 seconds for power-on diagnostics to complete.

Is an error code displayed?
Y N

023

Go to Page 2, Step 021, Entry Point E.

024
Is there a second new style Feature ROS card installed?
Y N

025

- Leave the card out.

Go to Page 1, Step 005, Entry Point C.

026

- Leave the card out.

Go to Page 1, Step 004, Entry Point B.

027
Are there other cards installed in sockets C5, C7, D5, or D7?
Y N

(Entry Point F)

028
Are there two or more modules on the old style Feature ROS card (MIM 0710)?
Y N

029

Either the Feature ROS card or the ROS module is failing. See the following table and replace the most probable FRU first. The ROS module will either be replaced or transferred to the new Feature ROS card (MIM 0740 and 0741).

7 6
A B

A B
5 5

D2 XXXX XXXX=	PROBABLE FRU (see note)
0008	Module #4 Feature ROS card
0010 0020 0030	Module #3 Feature ROS card
0040 0080 00C0	Module #2 Feature ROS card
0100	Module #1 Feature ROS card
Any not listed above	Feature ROS card Module #1, 2, 3, or 4
NOTE: If a D2XXXX error is displayed indicating a module that is not installed, check to see if a patch card is installed.	

Replace all the cards and planar ROS disable jumpers removed in earlier steps.
Note: When replacing card P/N2451982 with the Addressable Feature Card, refer to MIM 0750 for switch settings.

030

- Look for the displayed error code in the following list.

D20008	D20030	D200C0
D20010	D20040	D20100
D20020	D20080	

Did you find the error code in the list?
Y N

031

The most probable cause is the old style Feature ROS card.
Obtain an Addressable Feature ROS card and transfer the modules to the new card. (Refer to MIM 0750 for switch settings).

If a failure still occurs, remove the modules one at a time and turn power on after each removal. The failing module is the one removed just before the 5294 power-on sequence was OK (MIM 0740).

7 7
A A

A B
5 6

032

See the table and replace the module indicated (MIM 0741).

D2 XXXX XXXX=	PROBABLE FRU (see note)
0008	Module #4
0010 0020 0030	Module #3
0040 0080 00C0	Module #2
0100	Module #1
NOTE: If a D2XXXX error is displayed indicating a module that is not installed, check to see if a patch card is installed.	

If the failure still occurs:
- Obtain a new Feature ROS card.
- Remove the modules from the old card and install the modules on the new card (MIM 0741).
- Install the new Feature ROS card (MIM 0740).

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

033
- Turn power off.
- Remove the old style Feature ROS card.
- Turn power on and wait 10 seconds for power-on diagnostics to complete.

Is an error code displayed?
Y N

034

Go to Page 3, Step 028, Entry Point F.

8
A

A
7

035

- Leave the card out.

Go to Page 1, Step 004, Entry Point B.

Replace all the cards and planar ROS disable jumpers removed in earlier steps.

DRIVER/RECEIVER INTERFACE MAP 0900

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0200	A	1	001
0200	B	1	004

001

(Entry Point A)

- Power off.
- See MIM 0520 for any information needed.
- Disconnect cable J01 from the logic board (MIM 0520).
- Power on.
- Wait 10 seconds for power-on diagnostics to complete.

Is the Ready LED on?
Y N

002
- Power off
- Reconnect cable J01 to the logic board.
- Select the twinaxial continuous transmit test by installing a jumper between J5-4 and J5-3 on the planar (MIM 0410).
- Remove the access panel from the bottom of the controller.
- Power on.
- Wait 10 seconds for the continuous transmit test to start.
- Probe all 'Rcv data' lines at socket A4 (MIM 0520).

NOTE: If an SRC D7 3YXX is displayed, probe only the line(s) for the failing port(s) indicated by Y (MIM 0520).

Are all the 'Rcv data' lines pulsing?
Y N

2A 2B C

C

003
- Probe the failing lines at C3 or C4 (MIM 0520).

Are all signals pulsing?
Y N

004

(Entry Point B)

- Power off.
- Remove the driver/receiver card(s) at C3 and C4.
- Select the twinaxial continuous transmit test, if not done earlier, by installing a jumper between J5-4 and J5-3 on the planar (MIM 0410).
- Remove the access panel from the bottom of the controller.
- Power on.
- Wait 10 seconds for the continuous transmit test to start.
- Probe the '+Xmit data' line and the 'X2FO' line at C3 or C4 (MIM 0520).
- Probe the'+DXE' line(s) for the failing port(s) at C3 or C4 (MIM 0520).

Are all lines pulsing?
Y N

005
- Probe the '+Xmit data' line and the 'X2FO' line at A4 (MIM 0520).
- Probe the '+DXE' line(s) for the failing port(s) at A4 (MIM 0520).

Are all lines pulsing?
Y N

006
- Power off.
- Check for a ground on the line(s) not pulsing.

If there is a ground, replace the logic board (MIM 0640).
If there is no ground, replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
- Reinstall the card(s) removed at earlier steps.

2D 2E 2F

E F
1 1

007
Replace the logic board (MIM 0640).
- Reinstall the card(s) removed at earlier steps.
- Remove the jumper installed between J5-3 and J5-4 on the planar (MIM 0410).

008
- Power off.
- Check for open or ground between the twinaxial connector of the failing port and the corresponding pins at C3 or C4 on the logic board (MIM 0520).

Is there an open or a ground?
Y N

009
- Ensure that +5 V and -5 V are present on sockets C3 and C4 (MIM 0520). If any voltage is missing, use MIM 0230 to isolate the cause.

- Check for a ground on any 'Rcv data' line that was not pulsing. If there is a ground, use MIM 0520 to isolate the cause.

If the above two are OK, replace the driver/receiver card.
- Remove the jumper installed between J5-3 and J5-4 on the planar (MIM 0410).

010
- Disconnect cable J01.
- Check the failing port connections for open or ground between J01 on the logic board and corresponding pins at C3 or C4 (MIM 0520).

Is there an open or a ground?
Y N

011
Replace the internal I/O cable.
- Reinstall the card(s) removed at earlier steps.
- Remove the jumper installed between J5-3 and J5-4 on the planar (MIM 0410).

012
Replace the logic board.
- Reinstall the card(s) removed at earlier steps.
- Remove the jumper installed between J5-3 and J5-4 on the planar (MIM 0410).

A B D
1 1 1

013
Replace the logic board.

014
- Power off.
- Remove the jumper installed between J5-3 and J5-4 on the planar (MIM 0410).

Replace :
1. Driver/receiver card.
2. Planar (MIM 0440) and reenter the configuration (MIM 0460).

Go to Verify MAP 0400, Entry Point A.

015
Open or grounded internal I/O cable. Repair or replace the internal I/O cable.

Work Station Attachment Cable MAP 0901

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001

001

(Entry Point A)

- This MAP is to be used to diagnose a possible problem with the twinaxial cable used to connect the work stations to the controller.

- Obtain a copy of the 5294 setup form.
- Identify which work stations are failing and the controller port used for attachment.
- If System Available is off at all attached work stations, all work stations are failing.
- If System Available is on at any attached display station you can use the following procedure to identify the failing work stations.
  1. Ensure that all work stations are powered on and connected to the cabling system.
  2. Display the CSU screen at any attached display station which has system available on (MIM 0460).
  3. Compare the setup form with the CSU screen to identify all failing work stations and the controller port(s) used.Any work station that is powered on and connected but is not shown on the CSU screen is a failing work station.

NOTE: If more than one controller port is used, determine which port(s) has failing work stations attached. If more than one port has failing work stations attached, perform the steps in this MAP starting at entry point A, once for each port with failing work stations attached.

Are all work stations attached to the port failing?

Y N

A B

A B

002

- Refer to the maintenance or setup manual for the work station and check the following for all failing work stations:
  1. Addresses are correctly set as per the set up form.
  2. No duplicate addresses on the same port.
  3. Terminator switches are correctly set.
  4. Cables are tightly and correctly connected.

Are the addresses and terminator switches set correctly?

Y N

003

Correct the address and/or terminator switches.
- Check for normal operation .

004

Go to Step 005, Entry Point B.

005

(Entry Point B)

- Disconnect the cable to the failing work station(s) at the 5294 I/O panel.
- Connect an ohmmeter to the twinaxial cable and check for the resistance as shown in the following chart.

Connect meter leads as follows: positive	negative	normal resistance
phase A	phase B	< 250 ohms
phase B	phase A	< 250 ohms
shield	Phase A	< 140 ohms
shield	Phase B	< 140 ohms

Were all resistance measurements in the normal range?

Y N

3 2
C D

006

NOTE; The term 'data path', includes all of the cables and accessories used to connect one or more work stations to a 5294 port.

The following steps must be performed at the work stations. You will need the following:

5294 MAPS and MIM.
ohmmeter.
configuration worksheet.

The data path must be terminated at the last work station by one of the following methods.

1. The last work station has cable-thru and has the terminator switch set to the terminate position (position 1).
2. The last work station does not have cable-thru (the work station has only one socket and the terminating resistance is always present).

- Determine if the data path is correctly terminated.

Is the data path correctly terminated?

Y N

007

Report the problem to the customer.

008

- Perform the work station twinaxial interface test on the last work station (MIM 3003).

Is the work station twinaxial interface OK?

Y N

009

Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.

E

010

- Reconnect the twinaxial cable to the last work station.
- Starting at the work station nearest to the 5294, do the following at each work station.
  1. Disconnect the twinaxial cable at socket 2 of the work station.
  2. Connect the ohmmeter to the twinaxial cable disconnected from socket 2 and check for the resistances as shown in the following chart.

Connect meter leads as follows: positive	negative	normal resistance
phase A	phase B	< 250 ohms
phase B	phase A	< 250 ohms
shield	Phase A	< 140 ohms
shield	Phase B	< 140 ohms

  3. If one or more resistance measurements are higher than the normal range, reconnect the cable to socket 2 then repeat steps 1 and 2 at the next work station until all measurements are in the normal range or until you have performed the test at the next to last work station.
  4. Answer yes to this question as soon as all resistance measurements are in the normal range.

Were all resistances in the normal range?

Y N

011

Report to the customer that the cable between the last work station and the next to last work station is open.

012

- Perform the work station twinaxial interface test on the work station that you just disconnected (MIM 3003).

Is the work station twinaxial interface OK?

Y N

013

Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.

3
F

014
Report to the customer that the cable between the preceding work station and the one just checked is open.

015
The following steps must be performed at the work stations. You will need the following:

5294 MAPs and MIM.
ohmmeter.
configuration worksheet.

- Disconnect the cable from the twinaxial socket (socket 1) of the last work station on the data path.
- Set an ohmmeter to the X1K or higher scale.
- Connect the ohmmeter to the twinaxial connector of the cable as shown following.
- If any measurement is less than 5000 ohms, record the ohmmeter connection that has the low resistance.

Connect meter leads as follows: positive	negative	normal resistance
phase A	phase B	> 5000 ohms
phase B	phase A	> 5000 ohms
shield	Phase A	> 5000 ohms
shield	Phase B	> 5000 ohms

Were all 4 resistance measurements more than 5000 ohms?

Y N

4 4
G H

H

016
- Leave the twinaxial cable to the last work station disconnected.
- Starting at the work station nearest to the 5294, do the following at each work station.
  1. Disconnect the twinaxial cable at socket 2 of the work station.
  2. Connect the ohmmeter to the twinaxial cable disconnected from socket 2 and check for the resistances as shown in the following chart.

Connect meter leads as follows: positive	negative	normal resistance
phase A	phase B	>5000 ohms
phase B	phase A	>5000 ohms
shield	Phase A	>5000 ohms
shield	Phase B	>5000 ohms

  3. If one or more resistance measurements are lower than the normal range, reconnect the cable to socket 2 then repeat steps 1 and 2 at the next work station until all measurements are in the normal range or until you have performed the test at the next to last work station.
  4. Answer yes to this question as soon as all resistance measurements are in the normal range.

Were all resistances in the normal range?

Y N

017
Report to the customer that there is a short circuit in the cable between the last work station and the next to last work station.

018
- Perform the work station twinaxial interface test on the work station that you just disconnected (MIM 3003).

Is the work station twinaxial interface OK?

Y N

4 4
J K

019
Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.

020
Report to the customer that there is a short circuit in the cable between the preceding work station and the one just checked.

021
- Jumper phase A to the shield at the twinaxial connector of the cable disconnected in the preceding step.
- At the controller end of the data path, set an ohmmeter to the X10K or higher scale. Connect the positive lead of the ohmmeter to the shield and the negative lead to phase B.
- Check for a resistance more than 5000 ohms.

Was the resistance measurement more than 5000 ohms?
Y N

022
The phase leads are reversed in the data path, probably because of a cabling system problem.
- Report the problem to the customer and decide if you will continue to isolate the failure.

Do you want to isolate the failure?
Y N

023
- Reconnect all cables.
End of call

L M

024
- Leave the twinaxial cable to the last work station disconnected.
- Starting at the work station nearest to the 5294, do the following at each work station.
  1. Set an ohmmeter to the X10K or higher scale.
  2. Disconnect the twinaxial cable at socket 2 of the work station.
  3. Connect the ohmmeter to the twinaxial cable disconnected from socket 2 as follows: the positive lead of the ohmmeter to the shield and the negative lead to phase B.
  4. Check for a resistance more than 5000 ohms.
  5. If the resistance measurement is less than 5000 ohms, reconnect the cable to socket 2 then repeat steps 1 and 2 at the next work station until the measurement is more than 5000 ohms or until you have performed the test at the next to last work station.
- When the measurement is more than 5000 ohms, the work station just disconnected or the cable from it to the preceding work station is the failure cause. Use MIM 3003 to check the work station.
- If the resistance is less than 5000 ohms at all work stations, the cable to the last work station is failing.

025
The data path must be terminated at the last work station by one of the following methods.

1. The last work station has cable-thru and has the terminator switch set to the terminate position (position 1).
2. The last work station does not have cable-thru (the work station has only one socket and the terminating resistance is always present).

- Determine if the data path is correctly terminated.

Is the data path correctly terminated?
Y N

026
Report the problem to the customer.

5
N

027

- Test the work station twinaxial interface of the last work station on the data path (MIM 3003).

Is the last work station twinaxial interface OK?

Y N

028

Repair the work station or report the problem to the customer for work stations that do not have IBM on-site service.

029

- If the work stations are still failing, the remaining possible causes are the following:
  1. Possible work station causes:
     a. Two or more work stations on the same data path are set for the same address.
     b. Shorted diodes in a work station twinaxial interface (can be tested using MIM 3003).
  2. Possible cabling system causes:
     a. A high resistance connection in the data path.
     b. A failing station protector.
     c. A cable in the cabling system that is not terminated.
     d. A data path length that is longer than the maximum permitted.
- The failure is probably caused by a problem in the cabling system.

Do you want to continue to check out the cabling system?

Y N

030

- Check to see if the work stations are still failing.

If the work stations are still failing, report to the customer that no problem was found and that the failure is probably in the cabling system.

031

- Check to see if the work stations are still failing.

If the work stations are still failing, report to the customer that the failure is caused by a cabling system problem.

To farther isolate the failure cause, the procedures in MIM 3001 must be used.

Work Station Attachment Cable MAP 0902

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001

001

(Entry Point A)

- This MAP is to be used when the IBM Cabling System is used in place of twinaxial cable to connect the work stations to the controller.

- Obtain a copy of the 5294 setup form.
- Identify which work stations are failing and the controller port used for attachment.
- If System Available is off at all attached work stations, all work stations are failing.
- If System Available is on at any attached display station you can use the following procedure to identify the failing work stations.
  1. Ensure that all work stations are powered on and connected to the cabling system.
  2. Display the CSU screen at any attached display station which has system available on (MIM 0460).
  3. Compare the setup form with the CSU screen to identify all failing work stations and the controller port(s) used.Any work station that is powered on and connected but is not shown on the CSU screen is a failing work station.

NOTE: If more than one controller port is used, determine which port(s) has failing work stations attached. If more than one port has failing work stations attached, perform the steps in this MAP starting at entry point A, once for each port with failing work stations attached.

Are all work stations attached to the port failing?
Y N

002
Go to Step 005, Entry Point B.

A

A

003
- Test the impedance matching device (IMD) connected to the controller (MIM 3004).

Is the IMD OK?
Y N

004
- Report the failure cause to the customer.

005

(Entry Point B)

NOTE: The term, 'data path', includes all of the cables and accessories used to connect one or more work stations to a 5294 port.

- Connect the IMD, at the controller location, to the cabling system wall connector if not connected.
- Set an ohmmeter to the X1or higher scale and connect the ohmmeter to phase A and phase B at the twinaxial connector of the IMD.
- Record the resistance measurement.
- Exchange the meter leads and record the resistance.

Were both resistance measurements less than 600 ohms?
Y N

006
The data path must be terminated at the last work station by one of the following methods.

1. Connected to the wall connector by a direct connect cable with a terminator assembly installed in socket 2 and the terminator switch (if present) set to the non-terminated position (position 2). This method can be used only with work stations that have cable-thru installed.
2. Connected to the wall connector by an IMD and the work station terminator switch (if present) set to the terminated position (position 1).

- Determine if the data path is correctly terminated.

Is the data path correctly terminated?
Y N

3 2 2
B C D

007
Report the problem to the customer.

008
- Check the IMD or direct connect cable and terminator assembly used at the last work station (MIM 3004).

Is the IMD or direct connect cable and terminator assembly OK?
Y N

009
Report the problem to the customer.

010
- Test the work station twinaxial interface (MIM 3003).

Is the work station twinaxial interface OK?
Y N

011
Repair the work station problem or report the problem to the customer for work stations that do not have IBM on-site service.

012
- Disconnect the controller from the cabling system wall connector.

The following steps must be performed at the cabling system distribution panel. You will need the following:

5294 MAPs and MIM.
ohmmeter.
configuration worksheet.
cable schedule.

- Perform the continuity test for each of the following in the order listed until you find an error or until all cable drops have been tested (MIM 3005).
  1. The cable drop from the distribution panel to the controller.
  2. The cable drops from the distribution panel to each work station (including the last) starting with the one nearest to the controller.
  3. If one or more work stations are connected to a different distribution panel, check the cable between panels then continue checking the work stations at the second panel.

(Step 012 continues)

(Step 012 continued)
Are all the cable drops OK?
Y N

013
Is the failing cable drop the one to the controller?
Y N

014
- Reconnect all cables at the distribution panel.
- Go to the work station attached to the failing cable drop and test the work station twinaxial interface (MIM 3003).

Is the work station twinaxial interface OK?
Y N

015
Repair the work station problem or report the problem to the customer for work stations that do not have IBM on-site service.

016
- One of the following is failing:

  1. The twinaxial Y, IMD, or direct connect cable between the work station and the wall connector.
  2. The terminator assembly.
  3. The cable drop from the distribution panel to the wall connector.

The procedures in MIM 3004 can be used to test the accessories listed above.

- Reconnect all cables in the original configuration.
- Report the failure cause to the customer.

017
- Reconnect all cables in the original configuration.
- Report to the customer that the cable drop from the distribution panel to the controller is failing.

3
E

5294

MAP 0902

PAGE 3 OF 7

018
- Reconnect all cables in the original configuration.

The failure is probably caused by one of the following:

1. Multiple connections with high resistance.
2. Cable length is in excess of the maximum permitted.

- Report the problem to the customer.

019
- Disconnect the IMD or direct connect cable from the twinaxial socket (socket 1) of the last work station on the data path.
- Set an ohmmeter to the X1K or higher scale.
- Connect the ohmmeter to the twinaxial connector of the cable as shown following.
- If any measurement is less than 5000 ohms, record the ohmmeter connection that has the low resistance.

1. Connect the positive lead to phase A and the negative lead to phase B.
2. Connect the positive lead to phase B and the negative lead to phase A.
3. Connect the positive lead to the shield and the negative lead to phase A.
4. Connect the positive lead to the shield and the negative lead to phase B.

Were all 4 resistance measurements more than 5000 ohms?

Y N

020
- Test the direct connect cable or IMD used to connect the last work station to the wall connector (MIM 3004).

Is the direct connect cable or IMD used at the last work station OK?

Y N

021
- Reconnect all cables in the original configuration.
- Report the failing cable to the customer.

G
3

022

(Entry Point C)

- At the last work station, connect the direct connect cable or IMD to the wall connector but do not connect it to the work station.

The following steps must be performed at the cabling system distribution panel. You will need the following:

  5294 MAPs and MIM.
  ohmmeter.
  configuration worksheet.
  cable schedule.

- Disconnect the red leg of the Y that is connected to the cable drop to the controller.
- Install a test connector on the cable drop to the controller.
- Set an ohmmeter to the X1K or higher scale.
- Connect the ohmmeter to check the resistance which was less than 5000 ohms in the end-to-end test performed earlier (see chart at right).
- Check for a resistance more than 5000 ohms.

If ohmmeter connection for earlier test was		connect ohmmeter leads as follows for this test	
positive	negative	positive	negative
phase A	phase B	green	red
phase B	phase A	red	green
shield	phase A	shield	green
shield	phase B	shield	red

Was the resistance measurement more than 5000 ohms?

Y N

023

- Leave the ohmmeter connected and disconnect the center connector of each Y one at a time starting with the Y nearest to the controller.
- Check for a resistance more than 5000 ohms after disconnecting each Y until you find a resistance more than 5000 ohms or until you have disconnected the center connector of all Ys.

Was the resistance measurement more than 5000 ohms after disconnecting the center connector of any Y?

Y N

024

- Report to the customer that the cable drop from the distribution panel to the last work station is failing.

5 5
H J

5294

MAP 0902

025

- The failing cable drop is the one that was disconnected just before the ohmmeter reading of more than 5000 ohms.
- Test the work station twinaxial interface of the work station that is attached to the failing cable drop (MIM 3003).

Did the work station check out OK?

Y N

026

Repair the work station problem or report the problem to the customer for work stations that do not have IBM on-site service.

027

Either the cable drop from the distribution panel or the twinaxial Y is failing.

- Report the problem to the customer.

To determine which is failing you can check the twinaxial Y (MIM 3004).

If the twinaxial Y is OK, then the cable from the distribution panel to the wall connector is failing.

028

- Report to the customer that the cable drop from the distribution panel to the controller is failing.

029

- Jumper phase A to the shield at the twinaxial connector of the cable disconnected in the preceding step.
- At the controller end of the data path, set an ohmmeter to the X1K or higher scale. Connect the positive lead of the ohmmeter to the shield and the negative lead to phase B.
- Check for a resistance more than 5000 ohms.

Was the resistance measurement more than 5000 ohms?

Y N

K L

030

The phase leads are reversed in the data path, probably because of a cabling system problem.

- Report the problem to the customer and decide if you will continue to isolate the failure.

Do you want to isolate the failure?

Y N

031

- Reconnect all cables in the original configuration.

End of call

032

- Leave the jumper installed at the last work station end of the data path.

Go to Page 4, Step 022, Entry Point C.

033

The data path must be terminated at the last work station by one of the following methods.

1. Connected to the wall connector by a direct connect cable with a terminator assembly installed in socket 2, and the terminator switch (if present) set to the non-terminated position (position 2). This method can be used only with work stations that have cable-thru installed.
2. Connected to the wall connector by an IMD and the work station terminator switch (if present) set to the terminated position (position 1).

- Determine if the data path is correctly terminated.

Is the data path correctly terminated?

Y N

034

Report the problem to the customer.

035

- Test the work station twinaxial interface of the last work station on the data path (MIM 3003).

Is the last work station twinaxial interface OK?

Y N

036

Repair the work station problem or report the problem to the customer for work stations that do not have IBM on-site service.

6
M

037
- Answer yes to the following question if the terminator assembly is not used.
- Test the terminator assembly (MIM 3004).

Is the terminator assembly OK?

Y N

038
- Report the failing terminator assembly to the customer.

039
- If the work stations are still failing, the remaining possible causes are the following:
  1. Possible work station causes:
     a. Two or more work stations on the same data path are set for the same address.
     b. Failing diodes in a work station twinaxial interface (can be tested using MIM 3003).
  2. Possible cabling system causes:
     a. A high resistance connection in the data path.
     b. A failing surge suppressor.
     c. A cable that is not terminated.
     d. The data path length is longer than the maximum permitted.
- The failure is probably in the cabling system.

Do you want to continue to check out the cabling system?

Y N

040
- Check to see if the work stations are still failing.

If the work stations are still failing, report to the customer that no problem was found and that the failure is probably in the cabling system.

N

N

041
- Disconnect the controller from the cabling system wall connector.

The following steps must be performed at the cabling system distribution panel. You will need the following:

5294 MAPs and MIM.
ohmmeter.
configuration worksheet.
cable schedule.

- Perform the following tests in the order listed until you find an error condition or until you have checked all the cable drops on the data path (including any cable between panels, if used) (MIM 3005).
  1. Test the cable drop from the distribution panel to the controller.
  2. Test the cable drops from the distribution panel to each work station (including the last) starting with the one nearest to the controller.
  3. If one or more work stations are connected to a different distribution panel, check the cable between panels then continue checking the work station cable drops at the second panel.

Are all the cable drops OK?

Y N

042

Is the failing cable drop the one to the controller?

Y N

043
- Reconnect all cables at the distribution panel.
- Test the twinaxial interface of the work station attached to the failing cable drop (MIM 3003).

Is the work station twinaxial interface OK?

Y N

044

Repair the work station problem or report the problem to the customer for work stations that do not have IBM on-site service.

7 7 7
P Q R

045

- One of the following is failing:
  1. The twinaxial Y, IMD, or direct connect cable between the work station and the wall connector.
  2. The terminator assembly.
  3. The cable drop from the distribution panel to the wall connector.

The procedures in MIM 3004 can be used to test the accessories listed above.

- Reconnect all cables in the original configuration.
- Report the failure cause to the customer.

046

- Reconnect all cables in the original configuration.
- Report to the customer that the cable drop from the distribution panel to the controller is failing.

047

- Perform the following checks for each work station that is attached to the data path. Ensure that you check all failing work stations and all other work stations that are connected to the same data path. For information on address/terminator setting, see the set up manual for the work station.
  1. Work station twinaxial interface check (MIM 3003).
  2. Addresses are correctly set as per the set up form.
  3. No duplicate addresses on the same port.
  4. Terminator switches are correctly set (if present).
  5. Cables are tightly and correctly connected.

Are all of the work stations OK?

Y N

048

Repair the work station problem or report the problem to the customer for work stations that do not have IBM on-site service.

049

- Check to see if the work stations are still failing.

If the work stations are still failing, report to the customer that the failure is caused by a cabling system problem.

To farther isolate the failure cause, the procedures in MIM 3001 must be used.

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0200	B	6	056

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
6	058	3001	A
6	059	3002	A

001

(Entry Point A)

- Use this MAP when either the EIA card or DDSA card is installed.
- Ensure that the communication card type defined in the configuration record matches the communication card installed (MIM 1064 and 0460).
- Use MIM 1021A if EIA card P/N 5864668 is installed at location C1. Note: This card is obsolete for the 5294 and should not be used.
- Use MIM 1021B if a new type EIA card is installed at location C1.
- Use MIM 1022 if a DDSA card is installed at location C1.

NOTES:
1. Before you replace any FRU, reseat the cards and communication cables. Also, check that the jumpers are set correctly (MIM 1050 for EIA, MIM 1051 for DDSA).
2. Ensure that the communication cable is disconnected from the Channel Service Unit if the DDSA card is installed. This is necessary to prevent interference with other stations on a multipoint network.

Did you come to this MAP because of a wrap level 3 error code (638AXX or 638CXX)?

Y N

002

- Compare the last 2 characters of the error code with the wrap 2 error code column of table 1021 or 1022.

Did you find the error code in the table?

Y N

3A 2B 2C

B C
1 1

003
- Replace the following FRUs in the order listed.
  1. Planar
  2. Communication card
- Power on after installing each FRU and enable the CE test 62 to verify the repair.

004

(Entry Point C)

Are any lines indicated by this error code a P-type line (MIM 102X)?
Y N

005

(Entry Point D)

Are any lines indicated by this error code an X-type line (MIM 102X)?
Y N

006

(Entry Point E)

- Enable the CE test 62 with the loop-on-error function (MIM 2012).
- Probe all R-type signal lines indicated by the displayed error code at both the C1 and A1 pins of the logic board.

NOTE: The time between pulses may be as long as 10 seconds. Wait at least 10 seconds before answering.

Does the signal line pulse at both pins?
Y N

007
Do all the lines pulse at the C1 pins?
Y N

3
D E F G H

E F G H

008
NOTE: The failing line is the one that is not pulsing.

Is the failing line at a down level?
Y N

009
Replace the communication card (MIM 1040) and set the jumpers (MIM 1050 or 1051).
- Return the controller to its normal setup.

010
Go to Page 5, Step 050, Entry Point G.

011
Replace the logic board (MIM 0640).

012
- Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
- Return the controller to its normal setup.

013
- Enable the CE test 62 with the loop-on-error function (MIM 2012).

- Probe all X-type signal lines indicated by the displayed error code at both the A1 and C1 pins of the logic board (MIM 102X).

NOTE: The time between pulses may be as long as 10 seconds. Wait at least 10 seconds before answering.

Do all the line(s) pulse at both pins?
Y N

014
Do all the lines pulse at the A1 pins?
Y N

3 3 3
J K L

D2 J2 K2 L2

A1 M N P

015

NOTE: Except for the '- wrap 2 control' line, the failing line is the one that is not pulsing. The '- wrap 2 Control' line should always be at a down level while the test is running.
- Answer NO if both probe lights are off.

Is the failing line at a down level?

Y N

016

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
- Return the controller to its normal setup.

017

Go to Page 5, Step 050, Entry Point G.

018

Replace the logic board (MIM 0640).

019

Are any lines indicated by the error code an R-type line?

Y N

020

Replace the communication card (MIM 1040) and set the jumpers (MIM 1050 or 1051).
- Return the controller to its normal setup.

021

Go to Page 2, Step 006, Entry Point E.

022

- Measure the voltage on the indicated line at the C1 pins of the logic board.

Is the voltage at the correct level?

Y N

023

- Measure the failing voltage at the logic board voltage test points (MIM 0611).

Is the voltage at the correct level?

Y N

M N P

024

Replace the power supply (MIM 0240) .
- Return the controller to its normal setup.

025

Replace the logic board (MIM 0640).

026

Is this the only line with this error code?

Y N

027

Go to Page 2, Step 005, Entry Point D.

028

Replace the communication card (MIM 1040) and set the jumpers (MIM 1050 or 1051).
- Return the controller to its normal setup.

029

Does this controller have the DDSA card installed (MIM 1064)?

Y N

030

- Measure the -8.5 V at C1D07.

Is -8.5 V present?

Y N

031

- Measure the -8.5 V at A9, B9 at the power supply DC connector (MIM 0230).

Is -8.5 V present?

Y N

032

- Replace the power supply (MIM 0240).

033

- Replace the logic board (MIM 0640).

034

Was the displayed error code 638C41?

Y N

5Q 5R 4S

035

(Entry Point F)

- Install the 25-pin cable wrap connector at the I/O panel.
- Install a red wire jumper from the X-type line to the R-type line at location C2 of the logic board, as shown by the wrap 3 path for the failing line (MIM 1021).
- Power on.
- Enable wrap level 3 by activating the CE test 63 (MIM 2012).

Does the test run without errors?
Y N

036
- Record the error code if not recorded earlier.
- Power off the controller.
- Remove the wrap connector, if installed.
- Remove the jumper installed at step 035.
- Use an ohmmeter to check for a ground on the failing line(s) at the C2 pins as indicated by the wrap 3 error code (MIM 1021).

The resistance to ground for each line should be more than 300 ohms for X-type lines and more than 1500 ohms for R-type lines.

A resistance to ground that is less than stated above is a ground condition for these lines.

Is the line grounded?
Y N

037
- Power on.
- Press the Error Reset key.
- Install the red wire jumper between the same X and R type line (same line name you used in step 035) at the corresponding C1 pins (MIM 1021).
- Enable wrap level 3 by activating the CE test 63 (MIM 2012).

Does the test run without errors?
Y N

5
T U V W

038
- Power off.
- Remove the jumper installed at step 037.
- Remove the EIA card.
- Power on.
- Reset any error.
- Enable the CE test 62 with the E option (MIM 2012).
- A different SRC may be displayed. Ignore it.
- Probe the R-type signal line at the C1 pin that the jumper was connected to in step 037.
- Answer NO if both probe lights are off.

Is the line at a down level?
Y N

039
Replace the EIA card (MIM 1040) and set the jumpers (MIM 1050).
- Return the controller to its normal setup.

040
- Check the failing line(s) for a ground on the logic board between locations A1 and C1.
- If there is a ground, replace the logic board (MIM 0640).

- If there is no ground, replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

041
Replace the EIA card (MIM 1040) and set the jumpers (MIM 1050).
- Return the controller to its normal setup.

042
- Disconnect the internal communication cable at location D2.

Is the line grounded now?
Y N

043
Replace the internal communication cable (MIM 1041).
- Return the controller to its normal setup.

5
X

5294

MAP 1000

044
- Remove the communication card from the logic board.

Is the line grounded now?
Y N

045
Replace the communication card (MIM 1040) and set the jumpers (MIM 1050 or 1051).
- Return the controller to its normal setup.

046
Replace the logic board (0640).

047
Repair or replace the internal communication cable.

048
- Power off the controller.
- Set the Test switch to Normal.
- Wait 5 seconds, then power on.
- Probe the '-wrap 2 control' line at C1D05.

Is the line at a down level?
Y N

049
Go to Page 4, Step 035, Entry Point F.

050

(Entry Point G)

- Power off.
- Remove the communication card.
- Power on.
- Reset any error.
- Enable the CE test 62 with the E option (MIM 2012).
- A different SRC may be displayed. Ignore it.
- Answer NO if both probe lights are off.

Is the line still at a down level?
Y N

051
Replace the communication card (MIM 1040) and set the jumpers (MIM 1050 or 1051).
- Return the controller to its normal setup.

Y

Q Y
3

052
- Check for a ground on the '-wrap 2 control' line on the logic board (MIM 1021).
- If there is a ground, replace the logic board (MIM 0640).
- If there is no ground, replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

053
- Disconnect the internal communication cable at location D2.
- Install red wire jumpers as follows:
  C2B02 to C2B09
  C2D05 to C2D13
- Enable wrap level 3 by selecting the CE test 63 (MIM 2012).

Is error code 63 8AXX displayed?
Y N

054
- Replace the internal communication cable.
- Return the controller to its normal setup.

055

- Check the lines shown in the wrap 3 column of table 1022 for an open or ground between the C2 and D2 pins.
- If there is an open or ground, replace the logic board.
- If there is no open or ground, replace the DDSA card.
- Return the controller to its normal setup.

056

(Entry Point B)

- Power off the controller.
- Set the Test switch to Normal.
- Wait 5 seconds, then power on.
- Probe the '-wrap 2 control' line at C1D05.

Is the line at a down level?

Y N

057

- The X.25 Support feature is installed if ROS module P/N 2452371 is present in position 2 of the Feature ROS card at C5 (MIM 0710) or if a ROS ID of 4X appears twice in the ROS ID line of screen C1 (MIM 2013).

Do you have the X.25 Support feature installed?

Y N

058

Online communication failure.
- Check PLE log (MIM 2013, test C2).

Go To Map 3001, Entry Point A.

059

Online communication failure.
- Check PLE log (MIM 2013, test C2).

Go To Map 3002, Entry Point A.

060

Go to Page 5, Step 050, Entry Point G.

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
0200	B1	9	074
0200	B2	10	079

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
10	086	3001	A
11	088	3002	A
10	087	3004	A

001

(Entry Point A)

1. Use this MAP only when the XLCA card is installed.

2. Ensure that the setting of the communication card type field in the configuration record matches the communication card installed (MIM 0460 and 1064).

3. When answering the following questions and when the MAP refers to MIM 1023, use the table of lines in MIM 1023A when the X.21 Switched Support feature is not installed or the table in MIM 1023B when the X.21 Switched Support feature is installed.

NOTE: Before you replace any FRU, reseat the cards and communication cables. Also, check that the jumpers are set correctly (MIM 1052).

Is the displayed error code either 621110 or 631924?
Y N

002
- Compare the last 2 characters of the error code with the error code column for the planar to communication card interface (A1/C1 pins) in MIM 1023A or 1023B.

Did you find the error code in the table?
Y N

8A 6B 2C

003

- Compare the last 2 characters of the error code with the error code column for the communication card to DCE interface (C2/D2 pins) in MIM 1023A or 1023B.

Did you find the error code in the table?

Y N

004

- Power off.
- Remove the XLCA card from location C1.
- Check all signal lines from logic board C2 to the DCE end of the external communication cable as shown in MIM 1023 for an open, a short circuit to ground, or a short circuit to another line.

Are any of the lines open or grounded?

Y N

005

Replace the following FRUs in the order listed.

1. Planar (MIM 0440 and 0460)
2. XLCA card (MIM 1040 and 1052)

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).
- Power on after replacing each FRU.
- If the X.21 switched support feature is not installed, use CE test 62 to verify the fix.
- If the X.21 switched support feature is installed, use CE test 63 to verify the fix.

006

Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

D

007

(Entry Point C1)

Do the lines indicated by the error code include the SET lines?

Y N

008

Do the lines indicated by the error code include the 'Transmit' and 'Receive' lines?

Y N

009

- Connect the Probe as follows:
  - Red lead to any D03 pin
  - Black lead to any D08 pin
- Connect the ground lead of the probe to C2B05.
- Connect the probe lead to C2D06.
- Enable the CE 67 test. The probe should indicate an UP level.
- Enable the CE 68 test. The probe should indicate a DOWN level.

Does the probe indicate the correct level for both tests?

Y N

010

- Power off.
- Remove the XLCA card from location C1.
- Check the 'control A', 'control B', 'indicate A', and 'indicate B' lines from the C2 socket to the DCE end of the external communication cable as shown in MIM 1023 for a short circuit to ground or a short circuit to another line.

Is there a short circuit on any line?

Y N

011

Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

5 3 3 3
E F G H

012

Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

013

- Connect the Probe as follows:
  Red lead to any D03 pin
  Black lead to any D08 pin

- Connect the ground lead of the probe to C1D08.
- Enable the CE 67 test. Probe both A1B12 and C1B12. The line should be at an DOWN level at both pins.
- Enable the CE 68 test. Probe both A1B12 and C1B12. The line should be at a UP level at both pins.

Does the probe indicate the correct level for both tests?

Y N

014

- Power off.
- Remove the XLCA card from location C1.
- Check the 'control A', 'control B', 'indicate A', and 'indicate B' lines from the C2 socket to the DCE end of the external communication cable as shown in MIM 1023 for an open, a short circuit to ground, or a short circuit to another line.

Is there an open or a short circuit in any line?

Y N

015

Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

J K

F J K
2

016

Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

017

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

018

(Entry Point C2)

- Connect the Probe as follows:
  Red lead to any D03 pin
  Black lead to any D08 pin

- Connect the ground lead of the probe to C2B02.
- Connect the probe lead to C2D05.
- Enable the CE 67 test. The probe should indicate an UP level.
- Enable the CE 68 test. The probe should indicate a DOWN level.

Does the probe indicate the correct level for both tests?

Y N

019

- Power off.
- Remove the XLCA card from location C1.
- Check the 'transmit A', 'transmit B', 'receive A', and 'receive B' lines from the C2 socket to the DCE end of the external communication cable as shown in MIM 1023 for a short circuit to ground, or a short circuit to another line.

Is there an open or a short circuit in any line?

Y N

4 4 4
L M N

020
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

021
Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

022
- Connect the Probe as follows:
  Red lead to any D03 pin
  Black lead to any D08 pin

- Connect the ground lead of the probe to C1D08.
- Enable the CE 67 test. Probe both A1B10 and C1B10. The line should be at an UP level at both pins.
- Enable the CE 68 test. Probe both A1B10 and C1B10. The line should be at a DOWN level at both pins.

Does the probe indicate the correct level for both tests?
Y N

023
- Power off.
- Remove the XLCA card from location C1.
- Check the 'transmit A', 'transmit B', 'receive A', and 'receive B' lines from the C2 socket to the DCE end of the external communication cable as shown in MIM 1023 for an open, a short circuit to ground, or a short circuit to another line.

Is there an open or a short circuit in any line?
Y N

024
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

5 5
P Q

025

Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

026

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

027

NOTE: The Integrated Logic Probe must be used for the following steps. The General Logic Probe cannot be used.

- Remove the wrap connector and connect the external communication cable to the DCE.
- Connect the Integrated Logic Probe as follows:
  Red lead to any D03 pin
  Black lead to C3B06

- Set the Gate Ref switch on the probe to +1.4.

- Connect a jumper wire from the + Gating terminal of the probe to the gate pin shown in the table.
- Probe the lines shown in the table and check that the level matches the level shown in the table.

Gate connection	Probe connection	Level
SET A at C2D04	SET B at C2B13	DOWN
SET B at C2B13	SET A at C2D04	DOWN
none	SET A at C2D04	pulsing
none	SET B at C2B13	pulsing

Did the line level indicated by the probe match the level shown in the table for all connections?

Y N

6 6
R S

028
- Power off.
- Remove the XLCA card from location C1.
- Check the 'SET A', and 'SET B' lines from the C2 socket to the DCE end of the external communication cable as shown in MIM 1023 for an open, a short circuit to ground, or a short circuit to another line.

Is there an open or a short circuit in either line?
Y N

029
Report to the customer that the signal element timing (SET) signals from the DCE appear to be failing and recommend that the customer call for service on the DCE.
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

030
Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

031
Does the displayed error code also indicate the 'transmit A', 'transmit B', 'receive A' or 'receive B' lines at the XLCA card to DCE interface (C2/D2 sockets)?
Y N

032
Does the displayed error code also indicate an R-type signal line at the XLCA card to planar interface (A1/C1 sockets)?
Y N

033
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

T U

034
Go to Step 038, Entry Point E.

035
Go to Page 3, Step 018, Entry Point C2.

036
Are any of the lines indicated by this error code a P-type line (MIM 1023)?
Y N

037

(Entry Point D)

Are any of the lines indicated by this error code an X-type line (MIM 1023)?
Y N

038

(Entry Point E)

- If the X.21 support feature is not installed, enable the CE test 62 with the loop-on-error function (MIM 0710, 2012).
- If the X.21 support feature is installed, enable the CE test 63 with the loop-on-error function (MIM 0710, 2012).
- Probe all R-type signal lines indicated by the displayed error code at both the C1 and A1 pins of the logic board.

NOTE: The time between pulses may be as long as 10 seconds. Wait at least 10 seconds before answering.

Does the signal line pulse at both pins?
Y N

039
Do all the lines pulse at the C1 pins?
Y N

8 7 7 7 7
V W X Y Z

Y Z
6 6

040

NOTE: The failing line is the one that is not pulsing.

Is the failing line at a down level?

Y N

041

Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

042

(Entry Point F)

- Power off.
- Remove the communication card.
- Power on.
- Ignore any error.
- Answer NO if both probe lights are off.

Is the line still at a down level?

Y N

043

Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

044

- Check for a grounded line on the logic board.
- If there is a ground, replace the logic board (MIM 0640).
- If there is no ground, replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

045

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

Replace the logic board (MIM 0640).

W X
6 6

046

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

047

- If the X.21 support feature is not installed, enable the CE test 62 with the loop-on-error function (MIM 0710, 2012).
- If the X.21 support feature is installed, enable the CE test 63 with the loop-on-error function (MIM 0710, 2012).
- Probe all X-type signal lines indicated by the displayed error code at both the A1 and C1 pins of the logic board.

NOTE: The time between pulses may be as long as 10 seconds. Wait at least 10 seconds before answering.

Do all the line(s) pulse at both pins?

Y N

048

Do all the lines pulse at the A1 pins?

Y N

049

- The failing line is the one that is not pulsing.
- Answer NO if both probe lights are off.

Is the failing line at a down level?

Y N

050

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

051

Go to Step 042, Entry Point F.

8 8
A A
A B

V A A
6 A B
  7 7

052
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).
Replace the logic board (MIM 0640).

053
- Compare the last 2 characters of the error code with the error code column for the communication card to DCE interface (C2/D2 pins) in MIM 1023A or 1023B.

Did you find the error code in the table?
Y N

054
- Compare the last 2 characters of the error code with the error code column for the planar to communication card interface (A1/C1 pins) in MIM 1023A or 1023B.

Are any lines indicated by the error code an R-type line?
Y N

055
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

056
Go to Page 6, Step 038, Entry Point E.

057
Go to Page 2, Step 007, Entry Point C1.

058
- Measure the voltage on the indicated line at the C1 pins of the Logic board.

Is the voltage at the correct level?
Y N

059
- Measure the failing voltage at the logic board voltage test points (MIM 0611).

Is the voltage at the correct level?
Y N

A A A
C D E

A A A A
1 C D E

060
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).
Replace the power supply (MIM 0240).

061
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).
Replace the logic board (MIM 0640).

062
Is this the only line with this error code?
Y N

063
Go to Page 6, Step 037, Entry Point D.

064
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

065
- Power off.
- Ensure that the diode jumper is properly installed on the XLCA card at positions I/J or that the jumper is presently in position J.
- Power on and wait 10 seconds for diagnostics to complete.
- Enable the CE test 62 with the E option (MIM 2012) if the error code was 621110.
- Enable the CE test 63 with the E option (MIM 2012) if the error code was 631924.
- Probe the Test/error indicate line at C1D10.
NOTE: The time between pulses may be as long as 10 seconds. Wait at least 10 seconds before answering.

Is the line pulsing?
Y N

066
Go to Page 6, Step 037, Entry Point D.

9
A
F

067
- Press Error Reset to stop the test.

Is the line at a down level?
Y N

068
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

069
- Compare the last 2 characters of the error code with the error code column for the communication card to DCE interface (C2/D2 pins) in MIM 1023A or 1023B.

Does the displayed error code also indicate one or more differential signal line(s) at the XLCA card to DCE interface (C2/D2 sockets)?
Y N

070
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

071
- Power off.
- Remove the XLCA card from location C1.
- Check all signal lines indicated by the error code from socket C2 to the DCE end of the external communication cable as shown in MIM 1023 for an open, a short circuit to ground, or a short circuit to another line.

Are any of the lines open or grounded?
Y N

072
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

073
Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

074

(Entry Point B1)

- Power off.
- Remove the XLCA card from location C1.
- Check all 'A' and 'B' lines from the C2 socket to the DCE end of the external communication cable as shown in MIM 1023 for an open or ground.

NOTE: This step is necessary when the external communication cable is at EC level 834326 because a single line failure may cause a very intermittent failure that can not be detected by diagnostics.

Are any of the lines open or grounded?
Y N

075
NOTE: Answer yes to the following question if either of the conditions is true.

Is this machine a 5294 model K01 or does this machine have The X.21 switched support feature installed (MIM 2013)?
Y N

076
Go to Page 10, Step 080, Entry Point G.

077
Go to Page 10, Step 084, Entry Point H.

078
Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

A A
H J

079

(Entry Point B2)

- Power off.
- Remove the XLCA card from location C1.
- Check the 'indicate A', 'indicate B', 'control A', and 'control B' lines from the C2 pins to the DCE end of the external communication cable as shown in MIM 1023 for an open or ground.

Are any of the lines open or grounded?
Y N

080

(Entry Point G)

- Power off.
- Install the wrap connector if not already installed.
- Set the Test switch to Normal.
- Power on and wait 10 seconds.
- Select concurrent diagnostic screen C2.
- Observe the '-Received line signal detector' bit in the EIA register display. It should be a 1.
- Install a jumper from C1D08 to C1D02.
- Observe the '-Received line signal detector' bit in the EIA register display. It should be a 0.

Was the '-Received line signal detector' bit in the EIA register correct for both observations?
Y N

081
- Install a jumper from C1D08 to C1B12.
- Observe the '-Received line signal detector' bit in the EIA register display. It should be a 0.

Was the '-Received line signal detector' bit in the EIA register correct?
Y N

082
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

1 1 A G   A H   A J

083
Replace the XLCA card (MIM 1040) and set the jumpers (MIM 1052).

084

(Entry Point H)

- Check for the installation of the X.25 feature by looking for one of the following:
  ROS ID of 4X is shown twice on the ROS ID line of screen C1 (MIM 2013).
  ROS module P/N 2452371 is installed in position 2 of the feature ROS card at C5 (MIM 0710).

Do you have an X.25 feature installed?
Y N

085
- Check for the installation of the X.21 feature by looking for one of the following:
  ROS ID's of 4X and 5X are shown on the ROS ID line of screen C1 (MIM 2013).
  ROS module P/N 2452080 is installed in position 2 of the feature ROS card at C5 (MIM 0710).

Do you have an X.21 feature installed?
Y N

086
Online communication failure.
- Check PLE log (Test C2, MIM 2013).
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

Go To Map 3001, Entry Point A.

087
Online communication failure.
- Check PLE log (Test C2, MIM 2013).
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

Go To Map 3004, Entry Point A.

1 1 A K

088
Online communication failure.
- Check PLE log (Test C2, MIM 2013).
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

Go To Map 3002, Entry Point A.

089
Use MIM 1023 to isolate the failing line to the logic board, the internal communication cable, or the external communication cable. Replace the failing FRU and verify the fix.
- If the diode jumper assembly is not used on the XLCA card, move the jumper installed on the XLCA card from the J position to the I position (MIM 1052).

SDLC ONLINE COMMUNICATIONS MAP 3001

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
1000	A	1	001

001

(Entry Point A)

NOTE: Answer YES if a busy signal is received by the calling system when the communication line is not being used. This MAP assumes that wrap level 2 (which is automatically run during power-on diagnostics) and wrap level 3 tests have run successfully.

Is the problem associated with the autoanswer function (failure to autoanswer)?
Y N

002
Was operator error code 004X or 005X displayed when attempting to run the online tests?
Y N

003

(Entry Point B)

- Read all of this step before starting.

Establish communication with the host system.

- Dial the host system operator on a nearby telephone and have the operator put your station online (vary on command).
- Request the host system operator to remain on the telephone to aid you in determining if the host system is attempting to communicate with your station.

NOTE: When the host system operator puts your station online, the system should immediately attempt to transmit to your station unless you are
(Step 003 continues)

4 3
A B

(Step 003 continued)
on a switched network.

If you are using a switched network, dial the host system on the communication line when the system is ready for the call. If the system does not receive a response after a specified number of attempts, your station will be taken offline (and the line disconnected if on a switched line) and a message displayed for the system operator. When this occurs, the operator must put your station back online before you answer the following questions about the lights and received signals.

IMPORTANT NOTICE
If the host system is not attempting to communicate with your station while you are answering the following questions, the results will not be valid.

Is a sign-on screen displayed?
Y N

004
- Select concurrent diagnostic mode.
- Observe the SDLC status byte by selecting C2 test (MIM 2013).

Is the 'Address compare' bit on?
Y N

005

- Observe the Comm Line Sync LED on the operator panel of the 5294.

Does the Comm Line Sync LED flash?
Y N

006
Does this controller have the DDSA card installed (MIM 1064)?
Y N

3 2 2 2 2
C D E F G

007
Ensure that NRZI option used is correct and the same at both the 5294 and the host system. If the NRZI option used is correct and the same at both locations, the problem is external to this controller.
- Report to the host site that no data is being received from the communication line.

Probable cause: DCE or communication line failure.

008
Go to Page 6, Step 064, Entry Point D.

009
- Set Test switch on the controller to Test.
- On an attached display:
- Press the Cmd key, the Test Request key, (or press and hold down the Alt key, and press the Test key) and the C key.
- Select C1 (MIM 2013).
- SDLC configuration bits are displayed on the top line of the screen (MIM 2013).
- Determine the NRZI option used for this controller.
- Ask the host system operator what NRZI option is used for the communication line to this controller.

Is the NRZI option used for this controller correct and the same as used by the host system for the communication line to this controller?
Y N

010
- Have the customer correct the configuration at the 5294 or host system as needed.

011
- Report to the host site that flags are present on the communication line but no frames are present that contain the correct address for this station.

Probable cause: wrong address used by this station or the host system, or a host system problem.

012
Is the 'CRC OK' bit on?
Y N

H J

H J

013
- Report to the host site that SDLC frames are being received by this station but they contain CRC or frame sequence errors. Probable cause: line, modem/DCE, or host system problem.

014
Is the 'SNRM received' bit on?
Y N

015
Is the 'XID received' bit on?
Y N

016
- Report to the host site that SDLC frames are being received by this station without CRC errors and with the correct address but neither an SNRM nor an XID command has been received.

Probable cause: communication link failure or host system problem.

NOTE: If CE test 66 can be run without error, the communication link is OK (MIM 2012).

017
- Report to the host site that SDLC frames with the correct address and without CRC errors are being received, but a set normal response mode command has not been received.

Probable cause: communication link failure or host system problem.

NOTES:
1. On a multipoint network, this failure could be caused by two controllers set to the same address. If another controller on this line is also failing, ensure that both are set to the correct address.
2. If CE test 66 can be run without error, the communication link is OK (MIM 2012).

018
- Observe the SNA state byte.

Is the 'ACTLU received' bit on?
Y N

3 3
K L

019
- Report to the host site that link level communication has been established but an ACTLU has not been received.

Probable cause: host system problem.

020
- Observe the SNA state byte.

Is the 'BIND received' bit on?
Y N

021
- Report to the host site that link level communication has been established and an ACTLU has been received but a BIND has not been received.

Probable cause: host system problem.

022
- Observe the SNA state byte.

Is the 'EC Load complete' bit on?
Y N

023
A failure has occurred during the EC download.
- Report to the host site that a failure occurred during the EC download time.

Probable cause: host system problem.

024
- Verify that the host system operator attempted to vary on the display station that you were observing and that other display stations also fail.
- Report to the host site that all appears normal except that a sign-on screen is not being received by the work stations at this location.

Probable cause: host system problem.

025
- Press the Cmd key.
- Press the Test Request key (or press and hold down the Alt key and press the Test key).

Is the Online Verification Test menu displayed?
Y N

M N

026
- Press the Reset key.
- Have one of the display operators attempt to sign on and run a normal job.

Can the operator sign on successfully?
Y N

027
- Report to the host site that all appears normal except the host system is not recognizing the input from the sign-on screen, either test request or normal job sign on.

Probable cause: host system problem.

028
- Report to the host site that no cause of failure was found, but the system did not correctly respond to the test request.
- Request the host site to report the test request failure and the intermittent communication problem to the host system CE.

029
If this controller is attached to a switched network, the intermittent problem may be caused by a difference in the quality of the line obtained each time a call is made.
- Check the entries in the error history table and see the communication error table at the end of Backup MAP 0300 for other possible causes.

030
Was operator error code 0052 displayed?
Y N

031
Was operator error code 0040 or 0043 displayed?
Y N

032
Was operator error code 0050 displayed?
Y N

033
Was operator error code 0042 or 0051 displayed?
Y N

4 4 4 4 4
P Q R S T

034
Was operator error code 0044 displayed?
Y N

035
Was operator error code 0054 displayed?
Y N

036
- If any other 004X or 005X operator error code is displayed:
  You are in the wrong MAP, or
  The planar is defective.

037
- The problem is external to the controller.
- Report to the host site that SDLC commands are being received that are not valid for this controller.

038
Go to Page 1, Step 003, Entry Point B.

039
Does this controller have the EIA card installed (MIM 1064)?
Y N

040
- Replace the communication card (MIM 1040).

041
The problem is external to this controller.
- Either the 'transmit clock' signal or the 'receive clock' signal from the DCE is failing.
- If the DCE is not an IBM modem, ask the customer to call the DCE service representative and report the failing clock signal.

042
Does this controller have the EIA card installed (MIM 1064)?
Y N

043
- Replace the communication card (MIM 1040).

U

A P Q U
1 3 3

044
The problem is external to this controller. The 'clear to send' signal from the DCE is failing.
- If the DCE is not an IBM modem, ask the customer to call the DCE service representative and report that the 'clear to send' line is failing.

045
- Set the Test switch on the controller to Test.
- On an attached display:

- Press the Cmd key, the Test Request key (or press and hold down the Alt key, and press the Test key) and the C key.
- Press enter to select the C1 screen.
- Communication configuration bits are displayed on the top line of the screen (MIM 2013).

Is the switched/nonswitched configuration bit correct for this setup (MIM 0460 and 2013)?
Y N

046
- Have the customer correct the configuration.

047
The problem is external to this controller.
- Report to the customer that the 'data set ready' signal from the DCE is failing (SRC 0040 or 0043) or the DDS network is out of service (SRC 0040 only).

048
- Replace the planar (0440) and reenter the configuration (0460).

049

Is the controller configured for DTR operation?
Y N

5 5
V W

050
- Select the C2 screen and observe the EIA register.
- Dial the number for the controller communication line from a nearby telephone.
- The 'CDSTL' bit should be on after 2 or 3 rings.

Did the 'CDSTL' bit in the EIA register go on after 2 or 3 rings?
Y N

051
- If necessary, dial the controller.
- Observe the 'Ring indicate' bit.

Is the 'Ring indicate' bit set to 1 with each ring?
Y N

052
- Meter the 'ring indicate' line at D2(C2)-B13.

Does the 'ring indicate' line go plus (+3 V to +15 V) when a ring signal is received?
Y N

053
The problem is external to this controller. No 'ring indicate' signal is being received from the DCE.
- If the DCE is not an IBM modem, ask the customer to call the DCE service representative and report that no 'ring indicate' signal is being received from the DCE.

054
- Check that the EIA card jumpers are set correctly(MIM 1050).
- Replace the EIA card (MIM 1040) and set all jumpers correctly (MIM 1050).

055
- Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

056

Is the 'data set ready' line active in 3 to 15 seconds after the ring stops?
Y N

X Y

057
- DCE failure on the 'data set ready' line.
- If the DCE is not an IBM modem, ask the customer to call the DCE service representative and report that the DCE is not responding to the 'data terminal ready' signal from the controller.

058
No problem in the autoanswer function.
Go to Page 1, Step 003, Entry Point B.

059
- Select the C2 screen and observe the EIA register.

Is the 'Data terminal ready' bit on?
Y N

060
- Replace the planar (MIM 0440) and reenter the configuration (MIM 0460)

061

Is the 'data set ready' bit on in 3 to 15 seconds after the ring stops?
Y N

062
- DCE failure on the 'data set ready' line.
- If the DCE is not an IBM modem, ask the customer to call the DCE service representative and report that the DCE is not responding to the 'data terminal ready' signal from the controller.

063
- No problem in auto answer function.
Go to Page 1, Step 003, Entry Point B.

064

(Entry Point D)

- Determine the correct clock speed for this controller. Check machine history. Also check that the Channel Service Unit speed is the same as that set on the DDSA card.
- Enable the CE test 69 (MIM 2012).

The clock speed is displayed in decimal in a field to the right of the error display field.

Is the displayed clock speed correct?

Y N

065

- Check the speed selection on the DDSA card (MIM 1051).

Replace the DDSA card (MIM 1040).

066

- Perform the clock synchronization check (1031), then return to this step.

Is the clock synchronization circuit operating?

Y N

067

Replace the DDSA card (MIM 1040).

068

Ensure that NRZI option used is correct and the same at both the 5294 and the host system. If the NRZI option used is correct and the same at both locations, the problem is external to this controller.

- Report to the host site that no data is being received from the communication line.
- Report to the host site that this controller is not receiving any valid signals.

Probable cause: host system or DDS network.

X.25 ONLINE COMMUNICATIONS MAP 3002

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
1000	A	1	001

001

(Entry Point A)

Was an SRC displayed when attempting to perform the online test?

Y N

002

(Entry Point B)

- Read all of this step before starting.

Establish communication with the host system as follows:

- Dial the host system operator on a nearby telephone and have the operator put your station online (vary on command).
- Request the host system operator to remain on the telephone to aid you in determining if the host system is attempting to communicate with your station.
- Use the normal procedures for your site to attempt to start communications with the host site.

Is a sign-on screen displayed?

Y N

3A 2B C

003

- Select concurrent diagnostic mode.
- Observe the X.25 status byte by selecting the C2 test (MIM 2013).

Is the 'Address compare' bit on?

Y N

004

- Observe the Comm Line Sync LED on the operator panel of the 5294.

Is the Comm Line Sync LED blinking?

Y N

005

The problem is external to this controller.

- Report to the customer that no data is being received from the network.

Probable cause: DCE or network failure.

006

- Report to the host site that flags are present on the communication line but no HDLC frames are present that contain the correct address for this station.

Probable cause: address used by the network is not 01 or 03.

007

Is the 'CRC OK' bit on?

Y N

008

- Report to the host site that HDLC frames are being received by this station but they contain CRC errors.

Probable cause: DCE or network problem.

009

Is the 'Link activated' bit on?

Y N

010

- Select the C1 screen.
- Check the X.25 configuration bits for the setting of the 'Link initialization' bit.

Is the 'Link initialization' bit correct for the network used?

Y N

2D 2E 2F

D E F
1 1 1

011
Correct the setting of the 'Link initialization' bit and attempt the failing operation again.

012
- Report to the customer that the link can not be activated.

Probable cause: DCE or network problem.

013
Is the 'Packet level restarted' bit on?
Y N

014
- Report to the customer that the packet level restart request was not successful.

Probable cause: DCE or network problem.

015
NOTE: A delay may occur between the time that your station is varied on and the time that the data transfer state is entered. If the bit is not on, wait at least 2 minutes for it to turn on before answering the following question.
Is the 'Data transfer state entered' bit on?
Y N

016
- Report to the customer that the 5294 could not enter the data transfer state.

Probable cause: DCE or network problem.

017
- Observe the SNA state byte.

Is the 'ACTLU received' bit on?
Y N

018
- Report to the host site that link level communications have been established but an ACTLU has not been received . Probable cause: host system problem.

019
- Observe the SNA state byte.

Is the 'BIND received' bit on?
Y N

G H

B G H
1

020
- Report to the host site that link level communications have been established and an ACTLU has been received but a BIND has not been received. Probable cause: host system problem.

021
- Observe the SNA state byte.

Is the 'EC Load complete' bit on?
Y N

022
A failure has occurred during the EC download.
- Report to the host site that a failure occurred during the EC download time.

Probable cause: host system problem.

023
- Verify that the host system operator attempted to vary on the display station that you were observing and that other display stations also fail.

- Report to the host site that all appears normal except that a sign-on screen is not being received by the work stations at this location.

Probable cause: host system problem.

024
- Press the Cmd key.
- Press the Test Request key (or press and hold down the Alt key and press the Test key).

Is the Online Verification Test menu displayed?
Y N

025
- Press the Reset key.
- Have one of the display operators attempt to sign on and run a normal job.

Can the operator sign on successfully?
Y N

3 3 3
J K L

026

- Report to the host site that all appears normal except the host system is not recognizing the input from the sign-on screen, either test request or normal job sign on. Probable cause: host system problem.

027

- Report to the host site that no cause of failure was found, but the system did not correctly respond to the test request.
- Request the host site to report the test request failure and the intermittent communication problem to the host system CE.

028

The failure is intermittent. Refer to the PLE log for possible causes. If no errors are logged, the probable cause is a network or host system failure.

029

Was an SRC of 004X or 005X displayed when attempting to run the online tests?

Y N

030

Was an SRC of 1100XX or 1200XX displayed when attempting to run the online tests?

Y N

031

Was an SRC of 18XXXX, 19XXXX, or 1AXXXX displayed when attempting to run the online tests?

Y N

032

Was an SRC of 1BXX00 displayed when attempting to run the online tests?

Y N

M N P Q R

033

If a 10XXXX SRC is displayed, the failure is probably caused by an operator error or a configuration problem.

If a 10XXXX SRC occurs during correct operation, either the X.25 feature ROS module or the planar is failing.

If any other SRC is displayed, either you are in the wrong MAP or the planar is failing.

034

- Refer to MIM section 2160 for the meaning of the cause code field of the SRC.
- Report the cause indicated by the cause code field to the customer.

Probable cause: Network failure.

035

- Refer to MIM section 2160 for the meaning of the cause code field and diagnostic field of the SRC. If the contents of the fields indicate a possible configuration problem, check the X.25 configuration (MIM 0460.2).
- If no configuration problem is found, replace the X.25 feature ROS module (MIM 0740) and attempt the failing operation again.
- If the failure still occurs, report the problem defined by the cause code and diagnostic fields to the customer.

Probable cause: Configuration does not match network subscription, X.25 feature ROS failure, or there is a network failure.

036

- Refer to MIM section 2160 for the meaning of the diagnostic field of the SRC. If the diagnostic field content indicates a possible configuration problem, check the X.25 configuration (MIM 0460.2).
- If no configuration problem is found, report the problem defined by the diagnostic field to the customer.

Probable cause: Configuration does not match the network subscription or there is a network failure.

037

Was operator error code 0052 displayed?

Y N

5 4
S T

038

Was operator error code 0040 displayed?

Y N

039

Was operator error code 0050 displayed?

Y N

040

Was operator error code 0042 or 0051 displayed?

Y N

041

Was operator error code 0041 displayed?

Y N

042

Was operator error code 0054 displayed?

Y N

5 5 5 5 5
U V W X Y Z

Z

043

Was operator error code 0045 displayed?

Y N

044

Was operator error code 0046 displayed?

Y N

045

Was operator error code 0047 displayed?

Y N

046

Was operator error code 0053 displayed?

Y N

047

- If any other 004X or 005X operator error code is displayed:
  You are in the wrong MAP, or
  The planar is defective.

048

- Report to the customer that the T1 timeout expired after the 10th attempt to transmit to the network with no transmission received from the network.

Probable cause: DCE failure.

049

- Attempt the failing operation again.
- If the failure continues to occur, report to the customer that the network is sending a disconnect command to the 5294 when the 5294 is in disconnect mode.

Probable cause: DCE or network failure.

050

- Display the C2 screen and observe sense byte 1 of the 0046 error (MIM 2013).
- Compare the sense byte with the list of supported commands and responses in the X.25 theory section of the MIM.

Is the command contained in the I-field of the frame reject a valid HDLC command for the 5294?

Y N

5 5 5
AA AB AC

051
- Replace the X.25 feature ROS module.
- If the failure continues to occur, report to the customer that the network is not receiving commands or responses correctly.

Probable cause: DCE or network failure.

052
- The problem is external to the controller.
- Report to the customer that the network is rejecting commands or responses that are valid.

Probable cause: DCE or network failure.

053
- The problem is external to the controller.
- Report to the customer that either a disconnect command or disconnect signal was received during link setup.

Probable cause: DCE failure.

054
- The problem is external to the controller.
- Ask the customer to report to the network that HDLC commands are being received that are not valid for this controller.
- Sense bytes 1 through 3 of the 0054 error in the PLE log contain the rejected command and the reject cause.

055
Go to Page 1, Step 002, Entry Point B.

056
Does this controller have the EIA card installed (MIM 1064)?
Y N

057
- Replace the XLCA card (MIM 1040).

058
The problem is external to this controller.
- Either the 'transmit clock' signal (0051) or the 'receive clock' signal (0042) from the DCE is failing.
- Ask the customer to call the DCE service representative and report the failing clock signal.

059
Does this controller have the EIA card installed (MIM 1063)?
Y N

060
- Replace the communication card (MIM 1040).

061
The problem is external to this controller. The 'clear to send' signal from the DCE is failing.
- Ask the customer to call the DCE service representative and report that no 'clear to send' signal is being received from the DCE.

062
The problem is external to this controller.
- Ask the customer to call the DCE service representative and report that a ready signal is not being received from the DCE.

063
- Replace the planar (0440) and reenter the configuration (0460).

Online Intermittent Problem MAP 3003

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0300	A	1	001

001

(Entry Point A)

Do you have a DDSA card installed?

Y N

002

(Entry Point B)

- Run the CE 63 test with C option 1000 times. The approximate run time is shown in the following table (MIM 2012).

Comm Card	CE Test	Run Time
EIA	63	2 min
DDSA	63	2 min to 13 min
XLCA	63	3 min to 13 min

Did an error occur while the CE test was running?

Y N

2 A B C

B C

003

- The cause of the failure is probably external to this controller (more than 90 percent probable). If the failure continues to occur, check the hardware error log and PLE (permanent link error) log entries for this controller. Use the communication errors (004X, 005X, or 006X) to enter Backup MAP 0300.
- If an IBM external modem (or a modem/DCE with the same wrap function) is attached, the CE 64 test can be run to verify correct operation of the DTE interface section of the modem/DCE. When the CE 64 test runs 1000 times without errors, it is more than 90 percent probable that there is no failure in the DTE interface section of the modem/DCE. Approximate run time is shown in the following table.

Modem/DCE Speed	Run Time
2400 bps	13 min
4800 bps	12 min
7200 bps	11 min
9600 bps	10 min

004

- Use MIM 1021, 1022, or 1023 to check the communication interface line indicated by the error code.

NOTE: If the last 2 digits of the error code are not listed in the table, the failure is at the logic board connection (main planar to communication card).

- Check the DC voltage levels (MIM 0231) and the ripple levels (MIM 0232).
- Replace the communication card (if not replaced earlier) and run the failing CE test three times as long as it took for the first failure to occur.

Did the error occur again?

Y N

2 2
D E

005

- End of call.

006

- Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).
- Verify the repair by running the CE 63 test. Use the longer time of (1) 1000 times, or (2) three times as long as it took for a failure to occur.

Did the error occur again?

Y N

007

- End of call.

008

- The cause of the failure is probably external to this controller. Suspect environmental problems such as electrical noise on the AC power line or electrical discharge.

009

- Perform the clock synchronization check (MIM 1031).

NOTE: If the checking cannot be done, then replace the DDSA card and attempt the failing operation again.

Is the clock synchronization circuit operating?

Y N

010

- Replace the DDSA card (MIM 1040) and set the jumpers (MIM 1051).
- To verify the repair, go to Page 1, Step 002, Entry Point B.

011

Go to Page 1, Step 002, Entry Point B.

X.21 SWITCHED ONLINE COMM. MAP 3004

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0200	A	1	001
1000	A	1	001

001

(Entry Point A)

- Power down.
- Wait 5 seconds then power up.
- Read all of this step before starting.

- Ensure that no operation is attempted at any work station other than the one that you are using.

Establish communication with the host system as follows:

- Dial the host system operator on a nearby telephone and have the operator put your station online (vary on command).
- Request the host system operator to remain on the telephone to aid you in determining if the host system is attempting to communicate with your station.
- Use the normal procedures for your site to attempt to start communications with the host system.
- If an SRC of 210X00 (format for call progress signals) is displayed wait 1 minute or until an SRC other than 20XX00 is displayed before answering this question.

Is a sign-on screen displayed?

Y N

002

Is there an SRC displayed other than 210X00)?

Y N

6 3
A B C

C

003

- Select concurrent diagnostic mode.
- Observe the X.21 status byte by selecting the C2 test (MIM 2013).

Is the 'Call Sequence Started' bit on?

Y N

004

If the call was started by the operator at your location, check that the call procedure was performed correctly.

If the 'call sequence started' bit is not on after attempting to establish a call using correct procedure suspect an X.21 feature ROS or planar failure.

If the call was made by the host system, check that the host system is calling the correct number.

If the 'call sequence started' bit is not on after the host system attempts to establish a call, the problem is caused by a procedure error at the host system or by a DCE or network failure.

005

- Observe the X.21 status byte.

Is the 'Data transfer state entered' (SDLC mode) bit on?

Y N

006

The problem is external to this controller.

- Report to the customer that the network is not entering the data transfer state.

Probable cause: DCE or network failure.

007

- Observe the X.21 status byte.

Is the 'Address received' bit on?

Y N

008

- Report to the host site that flags are present on the communication line but no SDLC frames are present that contain the correct address for this station.

Probable cause: wrong address used by the host system or host system is using NRZI encoding.

2
D

009
Is the 'Good CRC' bit on?
Y N

010
- Report to the host site that SDLC frames are being received by this station but they contain CRC errors.

Probable cause: DCE or network problem.

011
Is the 'XID received' bit on?
Y N

012
Is the 'SNRM received' bit on?
Y N

013
- Report to the host site that SDLC frames are being received by this station without CRC errors and with the correct address but neither an SNRM nor an XID command has been received.

Probable cause: host system problem.

014
Go to Step 017, Entry Point B.

015
Is the 'SNRM received' bit on?
Y N

016
- Report to the host site that SDLC frames are being received by this station without CRC errors and with the correct address and the XID command has been received but the SNRM command has not been received.

Probable cause: host system problem.

017

(Entry Point B)

- Observe the SNA state byte.

Is the 'ACTLU received' bit on?
Y N

E F

018
- Report to the host site that link level communications have been established but an ACTLU has not been received.

Probable cause: host system problem.

019
- Observe the SNA state byte.

Is the 'BIND received' bit on?
Y N

020
- Report to the host site that link level communications have been established and an ACTLU has been received but a BIND has not been received.

Probable cause: host system problem.

021
- Observe the SNA state byte.
- If the 'EC load in progress' bit is on, wait 40 seconds or until the 'EC load complete' bit is set on before answering this question.

Is the 'EC Load complete' bit on?
Y N

022
A failure has occurred during the EC download.
- Report to the host site that a failure occurred during the EC download time.

Probable cause: host system problem.

023
- Observe the SNA state byte.

Is the 'SNA bind complete' bit on?
Y N

024
A failure has occurred after the EC download.
- Report to the host site that a bind failure occurred after the EC download was complete.

Probable cause: host system problem.

3
G

B G
1 2

025
- Verify that the host system operator attempted to vary on the display station that you were observing and that other display stations also fail.

- Report to the host site that all appears normal except that a sign-on screen is not being received by the work stations at this location.

Probable cause: host system problem.

026
Was an SRC of 004X or 005X displayed when attempting to run the online tests?
Y N

027
Was an SRC of 212000, 212300, or 216100 displayed?
Y N

028
Was an SRC of 212100 displayed?
Y N

029
Was an SRC of 212200 displayed?
Y N

030
- Look for the displayed SRC in the following list.
214100, 214300
214200, 215200

Did you find the displayed SRC in the list?
Y N

5 5 5 5 5
H J K L M N

N

031
- Look for the displayed SRC in the following list.
214400, 214600
214500, 214700

Did you find the displayed SRC in the list?
Y N

032
Was an SRC of 214800 displayed?
Y N

033
- Look for the displayed SRC in the following list.
214900, 220600, 221104
217100, 221000, 23XX00
220400, 221102, 240000
220500, 221103,

Did you find the displayed SRC in the list?
Y N

034
Was an SRC of 215100 displayed?
Y N

035
Was an SRC of 217200 displayed?
Y N

5 5 5 5 4 4
P Q R S T U

036

- Look for the displayed SRC in the following list.

218100, 218300
218200

Did you find the displayed SRC in the list?

Y N

037

- Look for the displayed SRC in the following list.

220000, 220200
220100, 220300

Did you find the displayed SRC in the list?

Y N

038

- Look for the displayed SRC in the following list.

220700, 220900
220800

Did you find the displayed SRC in the list?

Y N

039

Was an SRC of 221300 displayed?

Y N

040

Was an SRC of 221400 displayed?

Y N

041

If a 20XXXX SRC is displayed, the failure is probably caused by an operator error or a configuration problem.

If a 20XXXX SRC occurs during correct operation with correct configuration, then either the the X.21 feature ROS module or the planar is failing.

If any other SRC is displayed, either you are in the wrong MAP or the planar is failing.

V W X Y Z

T V W X Y Z
3

042

Ensure that the number called is correct.

- If the number called is correct then report the cause indicated by the SRC to the customer (MIM 21XX).

Probable cause: Network or host system problem.

043

Attempt the operation again. If this condition continues to occur, then replace the following FRUs in the order listed: planar (MIM 0440,0460), X.21 feature ROS (MIM 0740).

- If the condition still continues to occur, report the cause indicated by the SRC to the customer (MIM 21XX).

Probable cause: Network problem.

044

- Replace the planar (MIM 0440) and reenter the configuration (MIM 0460).

045

Ensure that the number called is correct.

- If the number called is correct then report the cause indicated by the SRC to the customer (MIM 21XX).

Probable cause: Host system programming or configuration problem.

046

If facility registration, cancellation, activation, or deactivation is a part of the operating procedures used to make a call, then this message is normal. Return to Entry point A and continue.

If none of the above was done, then there is a network problem.

047

Ensure that the number called is correct.

The customer should call the RPOA for information on why the called number is out of order.

L M P Q R S
3 3 3 3 3 3

048

Ensure that the number called is correct. The customer should call the network's Information Service for information on why the called number is temporarily unobtainable.

049

- Report the cause indicated by the SRC to the customer (MIM 21XX).

Probable cause: Network or DCE problem.

050

Ensure that the facility request code used is correct and that the operating procedures and configuration are compatible with the network subscription for the 5294 and host system locations.

If all of the above are OK, then the failure is caused by a network problem.

051

Have the customer ensure that both the DCE and the system at the host system location are powered on and ready and that the 5294 has been varied on. If both the host system and it's attached DCE are powered on and ready and the 5294 is varied on, then the failure is caused by a network problem.

052

Have the customer ensure that the number called is correct, and that the operating procedures and configuration are compatible with the network subscription for both the 5294 and host system locations.

Report to the customer that if the procedures and configuration are correct and compatible then the failure is caused by a network problem.

053

SRC 212200 indicates a procedure error in the selection signals sent to the network.

Ensure that the operating procedures are correct and attempt the operation again. If the same failure occurs again, report to the customer that the failure is caused by a DCE or network problem.

H J K
3 3 3

054

This can be a normal condition. Ensure that the number called is correct and attempt the call again. If the number is busy for longer than normal, have the customer call the host system to see if the host system port for the number called is actually busy.

If the host system port and DCE for the number called is ready and is not busy , the failure is caused by a network problem.

055

Ensure that the number called is correct and attempt the call again after one minute.

If the same problem occurs again, report the cause indicated by the SRC to the customer.

Probable cause: Network problem.

056

Was operator error code 0052 displayed?

Y N

057

Was operator error code 0040 displayed?

Y N

058

Was operator error code 0042 or 0051 displayed?

Y N

059

Was operator error code 0044 displayed?

Y N

060

Was operator error code 0054 displayed?

Y N

6 6 6 6 6 6
A A A A A A
A B C D E F

061
Was operator error code 0055 displayed?
Y N

062
- If any other 004X or 005X operator error code is displayed:
  You are in the wrong MAP, or
  The planar is defective.

063
- Replace the XLCA card (MIM 1040).

064
- The problem is external to the controller.
- Report to the host site that SDLC commands are being received that are not valid for this controller.

065
Go to Page 2, Step 017, Entry Point B.

066
The problem is external to this controller.
- The 'signal element timing' (SET) signal from the DCE is failing.
- Ask the customer to call the DCE service representative and report the failing signal.

067
The problem is external to this controller.
- Report to the customer that the DCE is in a 'not ready' state when it should be 'ready'.
- Ask the customer to call the DCE service representative and report the failure.

068
- Replace the planar (0440) and reenter the configuration (0460).

069
– Press the Cmd key.
– Press the Test Request key (or press and hold down the Alt key and press the Test key).

Is the Online Verification Test menu displayed?
Y N

070
- Press the Reset key.
- Have one of the display operators attempt to sign on and run a normal job.

Can the operator sign on successfully?
Y N

071
- Report to the host site that all appears normal except the host system is not recognizing the input from the sign-on screen, either test request or normal job sign on. Probable cause: host system problem.

072
- Report to the host site that no cause of failure was found, but the system did not correctly respond to the test request.
- Request the host site to report the test request failure and the intermittent communication problem to the host system CE.

073
The failure is intermittent. Refer to the PLE log for possible causes. If no errors are logged, the probable cause is a network or host system failure.

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Maintenance Analysis
Procedures
SY31-0652-5

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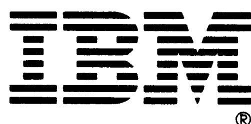
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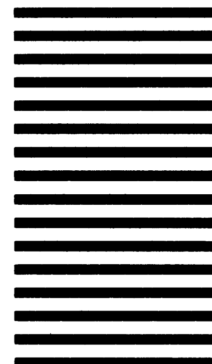
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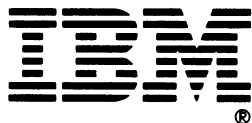
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